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SIXTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN,

FOR THE

FISCAL YEAR ENDING SEPT. 30, 1878.

THE
PROPERTY
OF THE
N. YORK HOSPITAL.

BY AUTHORITY.

LANSING:
W. S. GEORGE & CO., STATE PRINTERS AND BINDERS.
1878.

Office of the Secretary of the State Board of Health,
Lansing, Michigan, November, 1878.

To Hon. CHARLES M. CROSWELL, *Governor of Michigan:*

SIR:—In compliance with the laws of this State, I present to you the accompanying Report for the fiscal year ending September 30, 1878.

Very respectfully,
HENRY B. BAKER,
Secretary of the State Board of Health.

RESOLUTION OF THE BOARD RELATIVE TO PAPERS PUBLISHED IN ITS ANNUAL REPORT.

Resolved, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein.

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REPORT.

This is the Sixth Annual Report of the Secretary of the Michigan State Board of Health, and is for the fiscal year ending September 30, 1878. The first part of the volume, paged in Roman numerals, contains the Secretary's report of the work of the Board and in the office of the Board, special reports, communications, etc. In addition to this, the Report contains, in accordance with the law establishing the Board, sixteen papers upon different sanitary subjects. Of these, eleven were mostly written by members of the Board, three of them containing important contributions by regular correspondents of the Board; three others were compiled in the office, from data contributed by correspondents on blanks supplied by the Board, or in reply to circulars issued by the Board; two were written by persons not members of the Board. Three of these articles are illustrated by twenty-one full-page diagrams. The papers are published under the same resolution that has governed the subject in previous Reports, and which is reprinted here because it states definitely the conditions of their publication:

"*Resolved*, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein."

A new feature of the Report is the article on the Principal Meteorological Conditions in Michigan in 1877. This has been prepared for comparison with reports of diseases, and with statistics of deaths, now returned to the Department of State, and compiled under the direction of the Secretary of this Board. Reports of diseases in 1877 are printed in the article on Diseases in Michigan in 1877, in that on Outbreaks of Diphtheria, in the Special Reports in the first part of this volume, and other reports are tabulated in the article on Weekly Reports of Diseases in 1877; and comparisons of the data, concerning meteorological conditions and diseases, are greatly facilitated by the diagrams with which the articles are illustrated.

MEMBERS OF THE STATE BOARD OF HEALTH.

At the close of the fiscal year, the names and postoffice addresses of the members of this Board are as follows:

Robert C. Kedzie, M. D., President,	Agr'l College, Lansing.
Homer O. Hitchcock, M. D.,	Kalamazoo.
Henry F. Lyster, M. D.,	Detroit.
——— ———[*]	———.
Hon. LeRoy Parker,	Flint.
Rev. D. C. Jacokes, D. D.,	Pontiac.
Henry B. Baker, M. D., Secretary of the Board, and Supt. of Vital Statistics,	Office at Lansing.

STANDING COMMITTEES.

Certain kinds of work laid out by the Board have been classified and assigned to standing committees, each now consisting of a single member. The names and members of these committees are as follows:

1. Epidemic, Endemic, and Contagious Diseases,—Homer O. Hitchcock, M. D.
2. Sewerage and Drainage,—Henry F. Lyster, M. D.
3. Food, Drinks, and Water-Supply,—Robert C. Kedzie, M. D.
4. Buildings—Public and Private; including Ventilation, Heating, etc.,—Rev. D. C. Jacokes, D. D.
5. Climate—General, and by Season of Year, and as related to Age of Inhabitants,—Henry F. Lyster, M. D.
6. Disposal of Excreta and Decomposing Organic Matter,—Homer O. Hitchcock, M. D.
7. Poisons, Explosives, Chemicals, Accidents, and Special Sources of Danger to Life and Health,—Robert C. Kedzie, M. D.
8. Occupations and Recreations,— ——— ———.[†]
9. Education: the Relation of Schools to Health, the Kind and Methods of Instruction in Use, and Methods to be Proposed,—Rev. D. C. Jacokes, D. D.
10. Geology and Topography: Influence on Health, of Forests and their Removal, Shade Trees near Dwellings, etc.,— ——— ———.[†]
11. The Death-Rate as influenced by Age, Climate, and Social Condition,—Henry B. Baker, M. D.
12. Legislation in the Interests of Public Health,—Hon. LeRoy Parker.
13. Finance,[‡]—Hon. LeRoy Parker.
14. Mental Hygiene,—Homer O. Hitchcock, M. D.

MEETINGS OF THE BOARD.

The regular meetings of the Board have been held at Lansing, in the office of the Secretary of State, on the second Tuesdays of January, April, July, and October in each year, commencing at nine o'clock A. M.; the meeting in April is the annual meeting. Special meetings may be called at any time and place by the President, or by a majority of the members of the Board.

---

[*] The full Board consists of seven members, but no one has yet been appointed to fill the vacancy made by the resignation, on account of ill health, of Rev. Charles H. Brigham, of Ann Arbor.

[†] No appointment since the resignation of Rev. Chas. H. Brigham, of Ann Arbor.

[‡] One of the duties of this committee, on the finances of the Board, is to examine the Secretary's accounts and report of property, etc.

WORK OF THE OFFICE, FISCAL YEAR 1878.

The following is a statement of the main items of work during the year, grouped under two general heads, namely, the Collection of Information, and the Dissemination of Information.

COLLECTION OF INFORMATION.

CIRCULAR TO HEALTH OFFICERS IN THE STATE, TRANSMITTING BLANK FOR THEIR REPORT FOR THE YEAR ENDING DECEMBER 31, 1877.

At the close of the year 1877, the following circular (22) was planned, approved by the Board, printed, and sent to 1224 health officers of townships, cities, and incorporated villages, transmitting to them the blank form G for their annual reports, and also a blank for a copy of their records of cases of diseases dangerous to the public health which had occurred during the year. The nature of the information sought is evident on reading the circular and the blanks, which are printed on following pages. Reports were received from about 428 health officers; viz.,—

From health officers of 387 townships;
From health officers of 8 cities;
From health officers of 33 incorporated villages.

Reports of cases of diseases dangerous to the public health were received from about 205 health officers; viz.,—

From 183 health officers of townships;
From 4 health officers of cities;
From 18 health officers of villages.

The circular is similar to those sent for previous years to clerks of local boards of health, and which have been printed in former Reports.

To clerks of local boards of health a similar circular was sent for 1877, which is described on a following page.

The blank for a copy of the record of cases of diseases dangerous to the public health is printed, reduced in size, on page xviii of the Fifth Annual Report. It is like the Blank Record printed in connection with Circular 28, to health officers, on following pages of this Report, except that it is introduced by the words: "To the Secretary of the State Board of Health, Sir:—The following is a Report consisting of a Copy of the," and has a blank space for the official signature and date of sending the report.

The circular to health officers and the accompanying blank form are as follows:

CIRCULAR TO HEALTH OFFICERS.

[22.] OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, December, 1877.

To the Health Officer:

SIR:—Herewith I send you a blank form (G†) for your use in making your Annual Report to this Board, required by law,* for the year ending December 31, 1877. PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE AFTER THE CLOSE OF THE YEAR 1877. In making this report, you will probably do well to confer with the President, and also with the Clerk of your Board. The blank is somewhat similar to one sent to the Clerk of your Board, except that this is fuller in regard to the causes of disease and death, and in those questions for the best answer of which the knowledge of the physician is needed.

I send you a blank sheet for your Report of Cases of Diseases Dangerous to the Public Health.† If you have any cases on your Record, PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE after the close of the year 1877. If you have more cases to report than can be reported upon one side of a sheet (27), please write to this office for blanks, stating the additional number of sheets you need. If you have no case to report, *please send a definite statement to that effect;* and whether you have cases recorded or not, *please state your belief as to the number of cases of each of such diseases that have occurred within your jurisdiction that have not been legally reported to you.* You will find blank spaces for this near the middle of the first page of the blank form (G†).

The blank which I send for your report of Cases of Diseases is essentially the same form as the one several times recommended by this Board as a proper form for a Record of such cases. For the purpose of beginning or continuing such a Record, you can obtain sheets, or books of sheets similar to this one, except that they are for a Record† instead of a Report, of W. S. George & Co., Lansing, Mich., for eighty cents per quire or three dollars per hundred. If desired, the same dealers will bind them at usual prices.

The law requires that a notice be given to the Local Board of Health, or to the Health Officer, by every householder, whenever he shall know that any person within his family is taken sick with the small-pox, *or any other disease dangerous to the public health.* The law also requires physicians to report all such cases. See Sections (1734) 43 and (1735) 44, chapter 46 of Compiled Laws of Mich., 1871. The sections just mentioned refer only to township boards of health, but section (1740) 49 of the same chapter (46 of the Compiled Laws of 1871) seems to make them apply to cities and villages, except where special charter provisions conflict with this general law. If there should be any doubt, on the ground of charter provisions or otherwise, immediate steps, by ordinance if necessary, should be taken to secure such notices and reports.

It is not expected that it will always be possible, from the notices which you receive, to fill every column of your record; but so much as it is possible to learn concerning each case should be recorded and reported, because the single fact of the number of cases of sickness from each such disease will be of value in connection with the records of deaths and other knowledge collected at this office. Do not fail to record and report all cases of such diseases under your own care.

It is again recommended that your Board of Health *have a sufficient number of blank notices printed* for the use of *householders* and *physicians* within your jurisdiction, *and distribute them* in order to call attention to the law, and secure the material for a complete record in your office. The two sections of law, referred to above, should be printed on the back of each blank. You can find the form for such blanks for notices on pages 13 and 14 of the First Report, and on pages xiii. and xiv. of the Second Report of this Board.‡ They can be purchased of W. S. George & Co., Lansing, Mich., for one dollar per hundred.

In case any disease should appear in your locality as an epidemic, please make a Special Report of the fact to this office as soon as possible. It is also expected that you will study and record the conditions coincident with the rise, progress, and decline of any such epidemic, and in due time report the same to this Board. Concerning every such occurrence you should be able to report some facts which will be of use in advancing the cause of public health.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,

(PLEASE PRESERVE THE CIRCULARS FROM THIS OFFICE.) *Secretary.*

---

* Act No. 81, Laws of 1873, Sec. 3. It shall be the duty of the health physician, and also of the clerk of the local board of health of each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

† [The blank form G is printed below, reduced in size. The blank for Report of Cases of Diseases Dangerous is printed, reduced in size, on page xviii. of the Fifth Annual Report. It is on sheets 15½ by 19½ inches in size, printed alike on both sides.]

‡ [It is also given on pages xxvi–xxvii of this volume.]

BLANK FORM FOR ANNUAL REPORT OF HEALTH OFFICERS.

(Before filling any blanks, please read carefully through the entire form, including foot-notes and instructions.)

[G.]

To the Secretary of the State Board of Health: SIR:—

This ANNUAL REPORT TO THE STATE BOARD OF HEALTH by the Health Officer of the*..............of................ County of................, State of Michigan, for the year ending December 31, 1877, consists of this form, with[1] .... a Report of Diseases Dangerous to the Public Health,† which have occurred in this* .... during the year above stated, which is[2].........sent herewith on...... separate sheet.......

The **ratio of deaths** (from all causes) **to inhabitants** in this*................, during the year ending December 31, 1877, was[3]..........than the average of previous years.

The[4]..............of the death-rate was probably due to.........................
....

I estimate the **number of inhabitants** in this*................at[5]..............; and the **number of deaths** at[5]................

The **per cent of deaths to inhabitants,** during the year ending December 31, 1877, was................

Compared with previous years, the **ratio of sickness** (from all causes) **to inhabitants** in this*............, during the year ending December 31, 1877, was[3]............

The[4]..............of the **proportion of sickness** was probably due to...............
....

The greatest number of the **deaths** was from the diseases or causes (named in the order of greatest number), as follows:..

The greatest number of **cases of sickness** was from diseases (named in the order of greatest prevalence), as follows:..

To the best of my knowledge and belief, cases of Diseases Dangerous to the Public Health† have occurred within the jurisdiction of this board, during the year ending December 31, 1877, that **have not been reported** to me by the **householder** within whose family the case occurred, or by the **physician** in carge of said case, as follows: Of small-pox,............cases; of cholera,............cases; of scarlet fever,............ cases; of typhoid fever,............cases; of measles,............cases; of whooping-cough,............cases; of cerebro-spinal meningitis,............cases; of diphtheria, ...cases; of............,............cases. *These cases are included in the following statement.*

Including the cases legally reported to me and those not so reported, the cases of Diseases Dangerous to the Public Health,† **which have occurred** within the jurisdiction of this board, during the year ending December 31, 1877, have been, to the best of my knowledge and belief, as follows: Of small-pox,.........cases; of cholera,........cases; of scarlet fever,.........cases; of typhoid fever,.........cases; of measles, ...cases; of whooping-cough,.........cases; of cerebro-spinal meningitis,......... cases; of diphtheria,.........cases; of.........,.........cases.

The date of the **first case** of each disease was as follows: of small-pox,...........; of cholera,...........; of scarlet fever,...........; of typhoid fever,...........; of measles,...........; of whooping-cough,...........; of cerebro-spinal meningitis,........; of diphtheria,...........; of...........,...........

The date of the **last case** was as follows: of small-pox,...........; of cholera,..........; of scarlet fever,...........; of typhoid fever,...........; of measles,...........; of whooping-cough,...........; of cerebro-spinal meningitis,...........; of diphtheria, ...; of.........,.........

Cases of diseases Dangerous to the Public Health† **now prevail** as follows: Of small-pox,...........cases; of cholera,...........cases; of scarlet fever,...........cases; of typhoid fever,...........cases; of measles,...........cases; of whooping-cough,........cases; of cerebro-spinal meningitis,...........cases; of diphtheria,...........cases; of...........,...........cases.

The number of **deaths** during the year ending December 31, 1877, from Diseases Dangerous to the Public Health† is as follows: From small-pox,...........; from cholera,...........; from scarlet fever,...........; from typhoid fever,...........; from measles,...........; from whooping-cough,...........; from cerebro-spinal meningitis, ...; from diphtheria,...........; from...........,...........

So far as known, the sources from which the diseases were derived were as follows:[6]
Of small-pox,...........................; of cholera, ...;
of scarlet fever,...........................; of typhoid fever,...........................;

of measles,.................................; of whooping-cough,........................;
of cerebro-spinal meningitis,..............; of diphtheria,..................................;
of ....

The number of **cases of diseases on my record** which I report at this time in detail on the blank for that purpose, are as follows:[7] Of small-pox,...........cases; of cholera,.........cases; of scarlet fever,..........cases; of typhoid fever,.........cases; of measles,...........cases; of whooping-cough,...........cases; of cerebro-spinal meningitis,...........cases; of diphtheria,......... cases; of.........,.........cases.

I attribute the[8]..............in this*..............., during the year ending December 31, 1877, to the following causes or circumstances:........ ....
....

In my opinion the **principal sources of danger** to life or health in this*............., at the present time, are as follows:...

During the year ending December 31, 1877, the **climatic conditions** observed by me were as follows:...
....

During the year ending December 31, 1877, this Board of Health has met as a board ......time.., and the following is a condensed abstract of its proceedings:..........
....
....

My P. O. address is...

I hereby certify that, to the best of my knowledge and belief, the statements in the foregoing report are correct.

Dated..........................., 1878.

Signed..................................,
Health Officer[9] *of the**...............*of*.....................

FOOT-NOTES AND OTHER INSTRUCTIONS.

* Insert the word "township," "city," or "village."

† This is the term employed in the law. It includes all communicable diseases, whether epidemic, infectious, or contagious.

[1] If not sent, insert the syllable "out."

[2] If not sent, insert the word "not."

[3] Insert the words "greater," "less," or "the same," as the fact may be. If much greater or less, say so.

[4] Insert "increase" or "decrease," as the case may be.

[5] Insert the number in figures.

[6] After each disease insert the words, "the disease was contracted in the city of..............," or "at the school in..............," "in a room occupied by persons sick with the same disease.......... time since," "by means of clothing worn by patient with same disease," etc., etc., as the facts may be. In the case of typhoid fever, if the privy was near the well, or within the dwelling, state the facts.

[7] If there is absolutely no case to report, the blank form for cases need not be sent in as a part of your report. But it is important to fill all the blanks after names of diseases on this form, with ciphers if that expresses the truth, to show that you have no case of each disease.

[8] Insert the words "excessive mortality," "excessive sickness," "general healthfulness," or otherwise express the facts.

[9] Act No. 56, Laws of Michigan, 1877, amends section 1686 of the Compiled Laws of 1871, so that whereas heretofore a health officer *might* be appointed, it is now required that such officer *shall* be appointed; and if practicable he must be a physician. The law also requires that notice of such appointment shall be sent to the Secretary of the State Board of Health. The section as amended refers, as heretofore, only to township boards of health; but section 49 of the same chapter (46 of the Compiled Laws of 1871) makes it apply to cities and villages, except where special charter provisions conflict with this general law.

In filling blanks followed by such words as "deaths," "cases," etc., numbers should be stated, if possible, either in words or figures, and "0" should be written where that expresses the truth; for the reason that a blank space indicates that the item has been overlooked.

Please answer the questions as they are printed, and in the blanks left for the purpose. *Do no change or mark out any of the printed matter.* If you wish to communicate any item which will not go in the blank as printed, please write on a separate sheet of paper.

PLEASE FILL ALL BLANKS IN SOME WAY, TO SHOW THAT NONE HAVE BEEN OVERLOOKED.

CIRCULAR TO CLERKS OF LOCAL BOARDS OF HEALTH, TRANSMITTING BLANKS FOR THEIR REPORTS FOR THE YEAR ENDING DECEMBER 31, 1877.

At the same time that Circular 22 was sent to health officers, namely, the close of the year 1877, another circular (23), which had been prepared in the office of the Secretary and approved by the Board, was sent to clerks of local boards of health, transmitting a blank form (H) for their report for the year ending with December, 1877, and also the same blank for report of cases of diseases dangerous to the public health that was sent to health officers. The circular sent to clerks is similar to those sent for previous years, and differs from Circular 22 sent to health officers for 1877, and which is printed on pages ix.–x., only in the following points: (1.) It is addressed to the clerk instead of to the health officer, and suggests conference with the health officer; (2.) In place of the last sentence of the first paragraph of the circular to health officers, the circular to clerks reads: "The blank is similar to one previously used, except that the questions relative to permanent conditions, such as soil, streams, timber, etc., are omitted for this year, as they were for last year. In the mean time, replies to those questions will gladly be received from any clerk prepared to give them for localities for which accurate and full replies have not yet been given; and a blank will be sent to any clerk requesting it for that purpose." (3.) The last sentence of the fifth paragraph of the circular to health officers is omitted from the circular to clerks. The blank form (H) sent to clerks is similar to form G sent to health officers, which is printed on pages xi.–xii. of this Report, except that the form for health officers "is fuller in regard to the causes of disease and death, and in those questions for the best answer of which the knowledge of the physician is needed."

This circular was sent to 1,224 clerks of townships, cities, and incorporated villages. Annual reports were received from about 385 clerks; as follows,—

From 365 clerks of township boards of health;
From 7 clerks of city boards of health;
From 13 clerks of village boards of health.

Reports of cases of diseases dangerous to the public health, the blank form for which is printed on page xviii. of the Fifth Annual Report, were received from about 152 clerks of local boards of health; as follows:—

From 144 clerks of township boards of health;
From 5 clerks of city boards of health;
From 3 clerks of village boards of health.

The total number of health officers and clerks from whom annual reports were received is about 813; the total number from whom reports of cases of diseases dangerous to the public health were received is about 357.

COMPLETION AND CORRECTION OF REPORTS.

Many of the annual reports failed to make any statement on important points on which it would seem that information at least approximately correct might be given by the one making the report; many were obviously incorrect or inconsistent with the reports of cases of diseases which accompanied them: so that much correspondence with the authors of the reports was necessary to make these reports reliable and useful.

In order to lessen the labor of correspondence requisite to secure intelligible and correct returns, the following letters were printed on postal cards, and sent, as the case demanded, to health officers or clerks whose reports were incomplete or evidently inaccurate, and to those who stated that they were unable to make a satisfactory report. The result was, in many cases, a marked improvement in the quality of the returns.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Mich., ..., 1878.

DEAR SIR:—Your Annual Report for the year 1877 is received, and is not as the law requires, in the parts marked on a blank sent to you by this mail.

Please make out and send a complete report "on blanks and in accordance with instructions received from" this Board, as the law provides.

Very respectfully,

....,
Secretary.

OFFICE OF SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Mich.

DEAR SIR:—A report is considered satisfactory when every blank is filled in accordance with the best knowledge to be obtained by the Clerk or Health Officer who makes the report.

Every Clerk or Health Officer of a local board of health must know whether or not he has a record of cases of Diseases Dangerous to the Public Health; and if he has a record (whether kept for one day or for a full year, and whether it includes only cases under his own care), he certainly can report accurately the *number* of cases of each disease on that record. Certain other blanks in the form for the annual report can be filled accurately by positive statements, from the personal knowledge of the Clerk or Health Officer. The Clerk or Health Officer of a local board of health can *estimate* the number of cases of Diseases Dangerous to the Public Health which have occurred within the jurisdiction of his board and which have not been reported to him, and can probably in most instances approximate much nearer to the facts than can any non-resident person. Though the results reached in this manner may be inexact, they are far better than no statements, and without such estimates we have no statements. For the year just beginning, it is expected that you will make such arrangements as that the report by yourself or successor will be of still more value.

The instructions in the circular, and on the blank for your report, should be carefully read and understood by you before making your report.

In making your Annual Report, EVERY BLANK FOR A STATEMENT SHOULD BE FILLED, in accordance with our instructions, as the law itself requires. Many of these statements must necessarily be estimates, and in such cases the blank form provides for estimates; as, for instance, the blank for number of inhabitants, and, sometimes, the one for number of deaths from all causes. Certain other blanks, as those that provide for the statement of the number of cases on your record, are to be filled by positive statements, and a dash should never be used in the place of a cipher.

Trusting that these explanations, in connection with the instructions on the circular and blank form previously sent to you, will enable you to make a thorough and well-considered report in which every blank shall be filled, as I believe may be done in every locality, I remain,

Very respectfully,
HENRY B. BAKER,
Secretary.

CIRCULAR TO PRESIDENTS OF LOCAL BOARDS OF HEALTH, TRANSMITTING BLANKS FOR RETURN OF NAME AND POST-OFFICE ADDRESS OF HEALTH OFFICER.

In order to obtain the names and post-office addresses of local health officers in the State, for use in sending circulars, blanks, Reports, and for other correspondence, the following circular was prepared, approved, printed, and sent to all the supervisors in the State, just before the annual township meeting in April, 1878. It is similar to Circular 18, sent for the same purpose in 1877. The circular and the accompanying blank (reduced in size) are as follows:—

CIRCULAR TO SUPERVISORS.

[26.]

OFFICE OF THE STATE BOARD OF HEALTH,
Lansing, Mich., March, 1878.

To the Supervisor, as President of the Township Board of Health:

SIR:—Herewith I send you a copy of sections 1692 and 1693, Compiled Laws of 1871, as amended by Act No. 56, laws of 1877, *which now necessitates action by your local board of health "within thirty days after the annual township meeting."* The sections, as amended, are as follows:

"(1692.) SECTION 1. In **every** township **the township board shall be the board of health.** The supervisor shall be the president, and the township clerk shall be the clerk of said board. The clerk shall keep a record of the proceedings of the board in a book to be provided for that purpose at the expense of the township.

"(1693.) SEC. 2. **Every township** board of health **shall appoint and constantly have a health officer** of the township, who shall, where practicable, be a physician and sanitary adviser, and an executive officer of the board: *Provided*, That in townships where it is not practicable to secure the services of a well educated and suitable physician, the board may appoint the supervisor or some other person as such health officer. The board of health shall establish his salary or other compensation, and shall regulate and audit all fees and charges of persons employed by them in the execution of the health laws and of their own regulations. **Within thirty days after the annual township meeting** in each year, **the board of health shall meet** for the transaction of business and shall appoint or re-appoint a health officer, and **shall immediately cause to be transmitted to the Secretary of the State Board of Health,** at Lansing, the **full name and post-office address** of such health officer, **and a statement whether he is a physician,** the supervisor, or some other person not a physician. A special meeting of the board may be called by the order of the president or of any two members of said board."

It is important that the person appointed as health officer be promptly and officially notified of his appointment; and his oath of office required by Sec. 1, Art. XVIII., of the constitution of this State, should be on file in the office of the township clerk before the return of his name and post-office address is sent to this office, which the law requires shall be done "immediately."

If for any reason no health officer shall have been appointed "within thirty days after the annual township meeting," it will then be necessary to appoint one as soon as possible to fill the vacancy; as will also be necessary if the officer appointed does not qualify. Vacancies also occur whenever the incumbent of an office ceases to be an inhabitant of the township for which he was elected or appointed an officer.—See section 617, Compiled Laws of Michigan, 1871. The law requires that "every township board of health shall * * constantly have a health officer," and provides for calling special meetings, so that there would seem to be no difficulty in complying with the requirement.

If any change of the health officer occurs, or if his post-office address is changed, it will facilitate our work if your board will cause a notice of such change to be sent to this office.

In addition to his services as sanitary adviser of your local board of health, it is desirable that your health officer correspond freely with this office, concerning subjects connected with the public health in your locality. Any important sanitary experience of your board may, if thus reported, be made useful to other boards of health throughout the State.

Herewith please find a blank form and printed envelope *for the use of your board in sending to this office the statement of* NAME and POST-OFFICE ADDRESS of your HEALTH OFFICER, and whether or not he is a physician, as required by this law.

If you receive this before the township meeting, and are not re-elected, please pass this circular, blank form, and printed envelope over to your successor, and call his attention to the fact that it requires immediate action.

By direction of the State Board of Health.

Very respectfully,
HENRY B. BAKER,
Secretary.

(After detaching and returning the other half sheet, Form E, please preserve this circular for future reference.)

BLANK FORM FOR RETURN OF NAME AND ADDRESS OF TOWNSHIP HEALTH OFFICER.

(Please fill every blank, by words or figures, or as directed in the foot-notes. Do not mark out any printed word.)

[E.]

To the Secretary of the State Board of Health:

SIR:—On the............day of..............., 187.., the Township Board, being the Board of Health of the Township of............, County of............, State of Michigan, met for the transaction of business and*.......appointed a Health Officer.

The name of the Health Officer of this township is.................................
His post-office address is.................., County of.................., Michigan.
He†..............a physician.
He†..............the Supervisor of this township.
‡...................., Supervisor of the township of...............;
P. O. Address:..................................
‡...................., Township Clerk and Clerk of the Board of Health;
P. O. Address:..................................
This return is made out by§...
Dated at..........., this...........day of..............., 187..

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* If re-appointed, write "re-," if not, draw a line here.
† Insert the word "is," or "is not," as the case may be.
‡ It is not essential that more than one of the officers SIGN this return, but it is desirable to have the name and P. O. address of each given. If either officer writes in the name of the other, this fact should appear on this return, so that the officer making the return may be known.
§ Insert the words "the Clerk," "the Supervisor," "the Clerk and Supervisor," or otherwise state the facts.

In some of the townships, no health officer was appointed within thirty days after the annual township meeting, and in some of these townships the board of health did not seem to understand that the law requires that there shall constantly be a health officer. In order to secure the appointment of a health officer in all the townships, the circular was marked so as to call attention to the fact that a special meeting could be called, and that when no appointment or re-appointment had been made the office should be considered vacant, and the vacancy should be filled as soon as practicable, and the circular thus marked was sent to the supervisors of such townships as had not returned the name and post-office address of their health officer.

Proper returns of names and post-office addresses of health officers were received from about 754 townships.

CIRCULAR TO THE MAYOR AND ALDERMEN OF THE CITY, OR THE PRESIDENT AND COUNCIL OF THE VILLAGE, TRANSMITTING A BLANK FOR THE RETURN OF THE NAME AND POST-OFFICE ADDRESS OF THE HEALTH OFFICER.

As it was believed that the law requiring townships to appoint health officers was, by Section 1740 of the Compiled Laws of 1871, made equally applicable to cities and villages, a circular setting forth the law and making a demand for the return of the name and post-office address of the health officer, was planned, approved by the Board, printed, and sent to the mayors of all cities, and the presidents of all incorporated villages in the State. It was accompanied by a blank form (F) and by a directed envelope for the return of the name and address of the health officer. The circular is similar to Circular 20, sent out for the same purpose in 1877, except that in Circular 20 the sections of law and the opinion of the Attorney General,* referred to in Circular 27, are given in full. The circular is as follows. It is followed by the blank form F, which is, however, reduced in size.

CIRCULAR TO MAYORS OF CITIES AND PRESIDENTS OF VILLAGES.

[27.]

OFFICE OF THE STATE BOARD OF HEALTH,
LANSING, MICH., March, 1878.

To the Mayor and Aldermen of the City, or the President and Council of the Village:

GENTLEMEN:—The general law relative to Boards of Health in this State requires that every Board of Health "shall appoint and constantly have a Health Officer,"* and that THE FULL NAME AND POST-OFFICE ADDRESS OF THE HEALTH OFFICER shall be transmitted to the Secretary of the State Board of Health, at Lansing. The law provides that such appointments and return of names of health officers of *townships* shall occur "within thirty days after the annual township meeting." Section 1740, Compiled Laws of 1871, makes the general law for townships, as specified in Chapter 46 of the Compiled Laws of 1871, from which the foregoing is taken, apply to cities and villages, whenever it does not conflict with the charter of a city or village.†

In most cases it is known that there is no conflict between the general and the special law, and each City or Village should comply with Section 1695 Compiled Laws of 1871, as amended by Act 56 Laws of 1877, which requires that the name and post-office address of the Health Officer shall be sent to the Secretary of the State Board of Health, "immediately" after the appointment of such Health Officer.

If there is anything in the charter of your corporation which conflicts with the general provision for a return of the name and address of the Health Officer, I shall be thankful if you will send a statement of it.

It is respectfully suggested that the oath of office of your Health Officer, required by Section 1, Art. XVIII., of the Constitution of this State, should be on file in the office of the Clerk of your corporation before the return of his name and address is made to this office.

Herewith please find a blank from (F) and a printed envelope, for use in sending to this office, the name and post-office address of your Health Officer, in accordance with the law.

Have the kindness to cause the return to be made out and sent to this office, as soon as convenient, even though the term of office of your Health Officer has not just commenced or does not expire for some time to come.

The officer who makes this return will confer a favor if he will be particular to fill the blank for statement of time of expiration of term of office of the Health Officer, in order that I may then send another blank form for return, to facilitate compliance with the law.

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* This opinion is printed in Circular 28, relative to work of health officers and local boards of health, on a following page.

If any change of the Health Officer occurs, it will facilitate our work if you will cause a notice of such change to be sent to this office.

By direction of the State Board of Health.

Very Respectfully,

HENRY B. BAKER,
Secretary.

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* Section 1693, Compiled Laws of Mich., 1871, as amended by Act 56, Laws of 1877; and Section 1740, Compiled Laws of 1871.

† Opinion of Attorney General Kirchner, published by this Board in Circular 20, addressed to you in August, 1877. [Also printed in Circular 28, relative to work of health officers and of local boards of health, on a following page of this Report.]

BLANK FORM FOR RETURN OF NAME AND ADDRESS OF HEALTH OFFICERS OF CITIES AND VILLAGES.

(Please fill every blank, by words or figures, or as directed in the foot-notes. Do not mark out any printed word.)

[F.]

To the Secretary of the State Board of Health:

SIR:—The name of the Health Officer of this*..................................
is..
His full post-office address is ....,
County of.., Michigan.
He †.................a physician.
His term of office expires...
The person who is in fact the Health Physician of this*...........................
............is entitled, by our charter: ‡.......................................
By direction of the §...
Signed,................................, Clerk
of the *......................of.......................
Dated at......................., this................day of.........., 187...

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* Insert the word "city," or "village," as the case may be.

† Insert the word "is," or "is not," as the case may be.

‡ Please insert the words: "Health Officer," "President of the Board of Health," or state that the Health Officer is appointed by your body and not mentioned in the charter; or otherwise convey knowledge of the facts as they may be.

§ Insert the words "Mayor and Aldermen of the City of...............," or "President and Council of the Village of................;" or "Board of Health of the City (or village) of.............," or otherwise state the facts.

Many cities and villages made no return in response to this circular, and to such it was again sent, marked to call attention to the necessity for compliance with the law.

Returns were received from 27 cities and from 74 villages.

METEOROLOGICAL OBSERVATIONS.

One hundred and eighty-four monthly meteorological registers have been received during the year, on blanks supplied by this office, a copy of which, reduced in size, is printed on page 216 of this Report.* This does not include monthly summaries furnished by Theo. V. Van Heusen, Sergt. U.

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* The directions for taking observations and for care of instruments, which are printed on the back of the meteorological registers, are re-printed on pages xxv.-xxxix. of the Third Annual Report.

S. Signal Service, Detroit, not on these blanks. Records of meteorological observations have also been received from a few contributors outside the State, and from the health departments of several cities outside the State, in connection with the mortality statements mentioned in the Secretary's annual report of property, on following pages of this volume. The names and localities of observers in this State from whom reports have been received, and the months for which registers have been received from them, are given in the following tabular statement. The statements of registers received include both months mentioned.

Names of Observers, and Statements of Meteorological Registers received from them for Fiscal Year 1878.

NAME.	LOCATION.	Months for which Registers have been Received.
J. H. Kellogg, M. D.	Battle Creek	Oct., 1877 to Sept., 1878.
John Bell, M. D.	Benton Harbor	Oct., 1877 to Sept., 1878.
Lyman P. Alden	Coldwater (State Public School)	Oct., 1877 to Sept., 1878.
F. W. Higgins	Detroit (Woodmere Cemetery)	Oct., 1877 to Sept., 1878.
C. Henri Leonard, M. D.	Detroit	Oct., 1877 to Sept., 1878.
E. H. VanDeusen, M. D. Geo. C. Palmer, M. D.	Kalamazoo (Asylum for Insane)	Oct., 1877 to Sept., 1878
R. C. Kedzie, M. D.	Lansing (Agricultural College).	Oct., 1877 to Jan., 1878.
Hugh McColl, M. D.	Lapeer	Feb. to April, 1878.
Edwin Stewart, M. D.	Mendon	Oct., 1877 to Aug., 1878.
W. C. West, M. D.	Monroe	March to Aug., 1878.
J. S. Reeves, M. D.	Niles	Oct., 1877 to Sept., 1878.
Lee S. Cobb	Nirvana	Oct., 1877 to Sept., 1878.
A. W. Nicholson, M. D.	Otisville	Oct., 1877 to Aug., 1878.
H. T. Calkins, M. D.	Petoskey	Oct., 1877 to Sept., 1878.
Harrison Peters, M. D.	Tecumseh	Oct., 1877 to Sept., 1878.
J. S. Caulkins, M. D.	Thornville	Oct., 1877 to Sept., 1878.
Albert Yates, M. D.	Washington, Mich.	Sept., 1878.
Prof. L. McLouth,	Ypsilanti (State Normal School).	Oct., 1877 to Sept., 1878.

A compilation of the meteorological registers received for the year ending with December, 1877, has been made, for comparison with the weekly reports of diseases, and with other reports. It is printed on pages 211–250 of this Report.

Some of the observers are using instruments purchased by themselves; others have been in part supplied with instruments by the Board. All, whose records are regularly made and forwarded, are entitled to great credit for their unpaid services and their faithfulness in a matter requiring such constant attention, and consuming so much time as does the taking of meteorological observations three times a day for every day in the year. They have, however, the satisfaction of knowing that the value of the records is in proportion to the accuracy and regularity with which observations are taken. Not all of them have a complete set of instruments; hence some of the registers are incomplete. As fast as its limited means will allow, the Board is supplying the more important instruments to observers whose records are regularly made and recorded. The following instruments have been placed during the year; viz.:

Three Green's standard barometers.
One wet-bulb thermometer for psychrometer.
One rain-gauge.

REGULAR CORRESPONDENTS.

During the year. 19 new correspondents have been added to the list. The whole number is now 122. Some idea of the work done by these correspondents may be obtained from the articles on Weekly Reports of Diseases (pages 251-), on Diseases in Michigan in 1877 (pages 105–165), on Diphtheria (pages 75–89), on the Opium Habit in Michigan (pages 61–73), on Causation of Cancer by Use of Tomatoes (pages 33–38), on Wood Pavements and Sidewalks (pages 39–46), and on Special Reports and Communications to this Board, on following pages.

That it is often a great tax on the time and strength of men already overburdened with professional duties, to reply to circulars and make weekly reports of diseases, is evident; but it is only men of wide observation who can make trustworthy replies and reports, and those who do make the requisite effort have the satisfaction of knowing that whatever of excellence they contribute to the work belongs to it as a whole, and constitutes a permanent investment for the benefit of humanity.

RELATIVE TO REPORTS OF DISEASES IN MICHIGAN IN 1877.

Circular 24, relative to diseases in the State in 1877, was sent to the regular correspondents. It is similar to Circular 15, which was sent out in 1876. Circular 24 is printed on pages 107–110. Thirty-six correspondents replied. A summary of their replies is printed on pages 110–124; the replies themselves are printed on pages 124–165. This circular contains several questions relative to meteorological conditions, and to other conditions which may be supposed to affect the health of a community.

WEEKLY REPORTS OF DISEASES.

Weekly reports of diseases on printed postal-card blanks supplied by this office, have been received during the year from health officers of cities and from regular correspondents of the Board in different parts of the State. The average number of observers reporting has been somewhat greater than the average for the fiscal year 1877. A compilation of these reports for the calendar year 1877, is printed on pages 251 —. It may be compared with the statement of Meteorological Conditions for the same period, on pages 211–250. A copy of the postal blank in use for these reports is printed on page 255. Aside from the great value of these weekly reports for compilation, as permanent contributions to the study of the distribution and the causes of diseases, they enable the Board at any time, and the office at all times, to have a knowledge of the diseases present in the different parts of the State.

BOOKS AND PERIODICALS.

A list of the books and periodicals received by purchase or otherwise, and entered in the library, may be found in the Secretary's "Report of Property," on pages of this volume.

INFORMATION BY CORRESPONDENCE.

As a result of the large correspondence of the office with persons in this State and in other states and foreign countries a large amount of information is received, much of which is of immediate practical use in the work of the office. Of this nature are the special reports of outbreaks of diseases, suggestions by correspondents relative to special sources of danger to life or health, and communications from manufacturers and inventors of sanitary appliances. As instances of valuable papers which have resulted from questions, suggestions, or other communications in the correspondence of the office, reference may be made to the article on Diphtheria and to the document on the Restriction of Diphtheria (pages 75–89); to the report of the committee on epidemic, endemic, and contagious diseases, on the Supposed Causal Relation between Cancerous Diseases and the Use of Tomatoes as Food (pages 33–38); to the report of the committee on the disposal of excreta and decomposing organic matter, on Wood Pavements and Sidewalks (pages 39–46); to the report of the committee on poisons, explosives, chemicals, accidents, and special sources of danger to life and health, on Lead Poisoning from use of Tinned, Glazed, and Enameled Ware (pages 25–31); and to the Special Reports and Communications to this Board, on following pages in the first part of this volume.

DISSEMINATION OF INFORMATION.

FIFTH ANNUAL REPORT.

An important means of disseminating information on sanitary subjects is the publication of the Annual Reports of the Board. These are in part distributed, in the same manner as other public documents of the State, by the State Department. The law allows a limited number to be distributed, at the discretion of the Board, "to officers and members of local boards of health," and to "other persons interested in or laboring for the promotion of the cause of public health." Because of the time required to elaborate the plan of compiling the weekly reports of diseases, and to complete the compilation, and for other reasons, the publication of the Fifth Annual Report was delayed. The distribution by the State Department was made in September, 1878. The immediate distribution by this office to officers of local boards of health, etc., is not completed at the close of the fiscal year for which this is a report.

CIRCULAR TO SUPERVISORS AND OTHER TOWNSHIP OFFICERS RELATIVE TO NOTICES OF DISEASES, WHICH ENDANGER THE PUBLIC HEALTH,—DUTIES OF HOUSEHOLDERS, PHYSICIANS, AND OTHERS.

From its organization, the Board has aimed to secure a general compliance with the law which requires that householders and physicians shall give to local boards of health immediate notice of the occurrence of cases of diseases which endanger the public health. For this purpose, in the first year of its work, the Board caused the sections of the law to be printed on blanks convenient for such notices and designed to aid in securing such a record of said cases as would be useful in future study. These blanks have been freely distributed from time to time to officers of local boards of health, with the recommendation that they procure copies for distribution within their jurisdiction. Many boards have acted on the suggestion, and much good has resulted both in the actual restriction of diseases and in the education of the people and of physicians to the conviction that they have duties to perform in guarding life and health, which prudence and common humanity, no less than compliance with the laws of the State, require should be promptly and faithfully done.

At the meeting of the Board in January, 1878, Hon. LeRoy Parker, committee on legislation in the interests of public health, made a report calling attention to the fact that sections 696, 6852, and 6855 of the Compiled Laws of 1871, make it the duty of the supervisor and of the prosecuting attorney to prosecute householders and physicians for failure to comply with the law which requires them to give notice of the occurrence of cases of diseases which endanger the public health; and that section 6853 makes it the duty of every other township officer who may have good reason to believe that a penalty has been incurred by any householder or physician within the township, forthwith to give notice to the supervisor.

In order to call attention to the law and to set forth the importance of compliance therewith, Mr. Parker and Dr. Baker were appointed a committee to prepare a circular to supervisors and other township officers, which should embody these sections of law, and express the opinion of the Board on the subject. Accordingly the following circular (25) was prepared, submitted to the Board, approved, and printed. It was distributed, in March, 1878, to all the supervisors, township clerks, and justices of the peace, in the State, whose names and addresses were on file in the office of the Secretary of State. Subsequently it was sent to the health officer of every township, city, and village. To supervisors it was sent in the same envelope which carried Circular 26, demanding a return of the name and address of the township health officer, and which is printed on pages xv.–xvi. To health officers it was sent with Circular 28, printed on pages following, and with the document on the Restriction and Prevention of Scarlet Fever.* On the back of the circular was printed, in reduced form, the blank recommended by the Board for use of householders and physicians in giving notice of cases of diseases dangerous to the public health. To the supervisors and clerks there was sent in the same envelope with Circular 25, a poster containing said notice in full size, and also in large type, the sections of law (1734 and 1735) which require the notice from householders and physicians, with mention of sections 6852, 6853, and 6855, which state duties of supervisors and other township officers relative to prosecutions for failure to give said notice. The poster was headed: "HOUSEHOLDERS AND PHYSICIANS TAKE NOTICE." At the bottom was printed the following request: "PLEASE POST THIS IN A CONSPICUOUS PLACE,—IF POSSIBLE, AT THE TIME AND PLACE OF HOLDING THE TOWNSHIP MEETING."

It is believed that the attention of many people, in different parts of the State, was thus attracted to this important subject.

Circular 25 is as follows:

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* This document is printed on pages xxix.–xxxii. of the Fifth Annual Report.

CIRCULAR TO SUPERVISORS AND OTHER TOWNSHIP OFFICERS.

HOUSEHOLDERS' AND PHYSICIANS' NOTICES OF DISEASES WHICH ENDANGER THE PUBLIC HEALTH:

DUTIES OF SUPERVISORS AND OTHERS.

[CIRCULAR 25.]

OFFICE OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, March, 1878.

To the Supervisor and other Officers of the Township:

GENTLEMEN:—Your attention is respectfully asked to the laws in this State relating to the report of diseases which endanger the public health, and to some of the duties of supervisors and other officers of townships in connection therewith. Sections 1734 and 1735, Compiled Laws of Michigan, 1871, are as follows:

(1734.) SEC. 43. Whenever any householder shall know that any person within his family is taken sick with the small-pox, *or any other disease dangerous to the public health*, he shall immediately give notice thereof to the Board of Health, or to the Health Officer of the township in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars.

(1735.) SEC. 44. Whenever any physician shall know that any person whom he is called to visit is infected with the small-pox, *or any other disease dangerous to the public health*, such physician shall immediately give notice thereof to the Board of Health or Health Officer of the township in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit, for each offense, a sum not less than fifty nor more than one hundred dollars.

In each of the foregoing sections a penalty is imposed for neglect to comply with the requirements of the law. Section 696 of the Compiled Laws of Michigan, 1871, provides that "The supervisor of each township shall prosecute, in the name of the people of this State, or otherwise, as may be necessary, for all penalties and forfeitures incurred within his township, and for which no other officer is specially directed to prosecute."

Sections 6852, 6853, and 6855 of the Compiled Laws of 1871, are as follows:

Duty of supervisors to prosecute. (6852.) SEC. 12. It shall be the duty of every supervisor, whenever he shall know or have good reason to believe that any penalty or forfeiture has been incurred within his township, which shall be recoverable by action before a justice of the peace, according to the foregoing provisions of this chapter, forthwith to commence and prosecute a suit, in the name of the people of this State for the recovery thereof.

Duty of other township officers. (6853.) SEC. 13. It shall be the duty of every other township officer, who shall know or have good reason to believe that any penalty or forfeiture has been incurred within his township, forthwith to give notice thereof to the supervisors.

Duties of prosecuting attorney. (6855.) SEC. 15. In the cases mentioned in the last preceding section, and in all other cases where the prosecuting attorney shall know or have good reason to believe that a penalty or forfeiture has been incurred within his county, it shall be the duty of such prosecuting attorney, without delay, to prosecute for such penalty or forfeiture; and in all cases where any suit shall be instituted by the supervisor, as provided in this chapter, it shall be the duty of such prosecuting attorney, if requested by such supervisor, to attend to and conduct such suit on behalf of the plaintiffs.

The manner of commencing such action is specified in the same chapter (chapter 216) of the Compiled Laws, from which the sections just quoted are taken.

It is thus plain that when a householder or a physician does not comply with the requirements of sections 1734 and 1735, by giving immediate notice of any disease dangerous to the public health, it becomes the duty of the supervisor of the township to prosecute him, "in the name of the people of this State," for the recovery of the forfeiture.

In nearly all cases, epidemics can now be prevented by intelligent and active boards of health, if such boards receive due and timely notice of the first case, and first appearance of subsequent cases of all communicable diseases. In the interests of life and health it is, therefore, important that the laws requiring prompt notice to be given of the occurrence of diseases which endanger the public health shall be strictly complied with.

There are other reasons why these diseases should always be reported and carefully recorded. If this is done, such records will in time make it possible to learn much concerning such diseases and their prevention, which cannot well be learned in any other way.

In each township, the present law intrusts the guardianship of the public health with the township board, and this local board of health is largely responsible for the spread of any communicable disease within the township; because the board is supposed to have timely notice of every outbreak, and to act promptly for the restriction of any such disease. If the board does not receive such notices, this is, in some degree, its own fault; because the law requires each member of the board, whenever he shall "have good reason to believe" that a forfeiture has been incurred "forthwith to give notice" to the supervisor, and it is the duty of the supervisor "forthwith to commence and prosecute a suit."

But "prevention is better than cure," and a wise forethought, with a small outlay, employed in placing before the people the requirements of the law on this subject and the importance of compliance therewith, may save a much larger outlay in the prosecution of such cases, and especially may it save the great expense which would be required in combating a communicable disease if such disease should once get a start in the township.

It is, therefore, especially desirable that the township board take such action as will lead to a general understanding of this subject by the people of the township. As one means to this end, this State Board of Health recommends that every township board have printed and freely distributed within its jurisdiction, blanks for use of householders and physicians in giving notice of diseases which endanger the public health, on which blanks shall be printed sections 1734 and 1735, with such references to the requirements of sections 6852, 6853, and 6855, compiled laws of 1871, as will show the people the necessity for compliance with the first named sections.*

Such blank notices and sections of law may be distributed in various ways; but if the supervisor distributes them at the time of assessment or at any other time, and calls attention to the fact that the law requires him to prosecute for non-compliance, it is believed that much good will result from the attention thus attracted to the subject, and that there will then be fewer occasions for the prosecutions which it is the duty of the supervisor to make if occasion requires.

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* In order to make it certain that the expenses attending the work of the township board of health shall be duly provided for and promptly met, it is respectfully suggested that at the next township meeting a sufficient amount of money be voted (as provided in Act No. 212, Laws of Michigan, 1873), "for defraying all proper charges and expenses" by the board of health, to include expenses for distribution of public notices, for record books and blanks, compensation of the health officer, etc

Printed herewith is a form of Notice,* recommended by this Board, having upon its back sections 1734 and 1735 and summary statements of sections 6852, 6853, and 6855, compiled laws of 1871.

The first thorough distribution of these blank notices and sections of law throughout the township, will serve the very useful purpose of calling general attention to the subject, as will also public notices posted in conspicuous places; but in time the blanks may be mislaid; therefore, a constant supply of such notices should be provided for, from time to time, to be kept by each member of the township board of health, and some may be kept by the other justices of the peace, for distribution to physicians and householders in their vicinity whenever called for.

There need be no hesitation in enforcing this law, when it is considered how important are the results in human progress which may be secured through a better knowledge of the diseases which endanger the public health, and how just is the demand which the law makes on householders and physicians that they give prompt warning of danger to their fellow-beings. No humane person will refuse or neglect to warn a fellow-being of any danger, when by so doing the life of that fellow-being may be saved, and no other person's life endangered. Whenever we see a person unconsciously in danger, such as standing near a precipice, common sentiments of humanity dictate that we even incur risk to life in order to warn and save that person, if there is a greater probability of saving his life than of losing our own. In giving immediate notice of dangerous diseases, the householder or the physician does not risk life or limb, in many cases not even property, while the neglect to report may involve not only waste of property throughout the community by the losses which sickness always causes, but also may endanger the lives or future well-being of many neighbors and fellow citizens.

Because of the importance of general compliance with this humane law, it is hoped that you will give this subject your earnest attention.

By direction of the State Board of Health.

Very respectfully,
HENRY B. BAKER,
Secretary.

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* [Printed on pages xxvi.-xxvii. of this volume.]

BLANK NOTICE OF CASES OF DISEASES DANGEROUS TO THE PUBLIC HEALTH.‡

(Form of Notice recommended by the State Board of Health for the use of Householders and Physicians, in complying with sections 1734 and 1735, Compiled Laws of Michigan, 1871. See over. [Next page.])

*To the Clerk or Health Officer of the** .... *of* ...., *County of*

...., *State of Michigan, as Clerk or Health Officer of the Board of Health:*

SIR:—The following persons, within the jurisdiction of your board, have been taken sick with "diseases dangerous to the public health."†

NAMES OF PERSONS.	SEX.	AGE IN YEARS, LAST BIRTHDAY.	NAME OF DISEASE.	TAKEN SICK.			WHETHER DIED, LIVING, OR RECOVERED.	DATE OF DEATH OR RECOVERY.		
				MONTH.	DAY.	YEAR.		MONTH.	DAY.	YEAR.
....	......	......	....	......	......	......	....	......	......	......
....	......	......	....	......	......	......	....	......	......	......

So far as known, the source.... of the contagious or infectious cause.... of the disease..................as follows: For case No. 1, it was..

The residence of the sick persons above reported is as follows: Of case No. 1, it is at No.. ....street..................; of case No. 2, it is..

This Notice is given by..

Dated at No....................................street,.......................................,187.....

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* Insert the word *city*, *village*, or *township*.

† Includes Measles, Whooping-cough, Diphtheria, Scarlet Fever, Typhoid Fever, Puerperal Fever, Erysipelas, Small-pox, Cholera, etc.

‡ [This blank is printed on sheets 6¾ by 8¼ inches in size.]

[Blank Notices similar to this, including this and the following page, may be obtained of W. S. George & Co., Lansing, Mich., for one dollar per hundred.]

SECTIONS OF LAW AND BLANK FILING PRINTED ON BACK OF THE ABOVE [PRECEDING] NOTICE.

Sections 1734 and 1735, Compiled Laws of Michigan, 1871, are as follows:

(1734.) SEC. 43. Whenever any **householder** shall know that any person within his family is taken sick with the small-pox, *or any other disease dangerous to the public health*, he shall immediately give notice thereof to the Board of Health, or to the Health Officer of the township [city, or village*] in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars.†

(1735.) SEC. 44. Whenever any **physician** shall know that any person whom he is called to visit is infected with the small-pox, *or any other disease dangerous to the public health*, such physician shall immediately give notice thereof to the Board of Health or Health Officer of the township [city, or village*] in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit, for each offense, a sum not less than fifty nor more than one hundred dollars.†

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*See Section 1740, Compiled Laws of 1871.

†Supervisors must prosecute for all such forfeitures; township officers must give notice to supervisor; prosecuting attorney to conduct suit if requested; see sections 6852, 6853, and 6855, Compiled Laws of Michigan, 1871

Notice of sickness of...

....

Sick with...

....

Reported by..

....

Filed..

....

CIRCULAR RELATIVE TO THE WORK OF HEALTH OFFICERS AND OF LOCAL BOARDS OF HEALTH.

Though many re-appointments are made, many new health officers are appointed every year. Hence it is necessary that the circular relative to duties of health officers and of local boards of health should be distributed each year as soon as possible after returns are received of the names and addresses of health officers appointed. This necessity was made evident by the letters received from time to time asking for instructions with regard to those duties. Accordingly the circulars (19 and 21) sent out in 1877 were amended, combined in one circular, approved by the Board, printed as Circular 28, and sent to all the health officers in the State. In the same envelope with this circular were sent Circular 25, relative to notices of diseases which endanger the public health (printed on pages xxiii.-xxvii. of this Report), and the document issued by the Board in 1877, concerning the Restriction and Prevention of Scarlet Fever.* The circular is as follows. On the back of it was printed, reduced in size, the blank record of cases of diseases dangerous to the public health.

CIRCULAR TO HEALTH OFFICERS.

[28.] OFFICE OF FHE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, June, 1878.

To the Health Officer:

SIR:—A number of Health Officers, lately appointed under Act No. 56, Laws of Michigan, 1877, which provides for a Health Officer in every township, city, and village in the State, have asked for an outline of the duties of this officer as a "sanitary adviser" of the local board of health. In order to respond to these inquiries more fully than by the letters and documents already sent, this circular is issued. It is similar in some respects to circulars 19 and 21 issued by this Board last year.

The constitution of township boards of health was changed in 1877, sections 1692 and 1693 being so amended as to provide that "in every township the township board shall be the board of health," and that "every township [city, and village] board of health shall appoint and constantly have a health officer of the township who shall, where practicable, be a physician and sanitary adviser, and an executive officer of the board." If no health officer is appointed "within thirty days after the annual township meeting," it will become necessary to appoint one after that time, to fill the vacancy. Vacancies also occur whenever the incumbent of an office ceases to be an inhabitant of the district, county, township, city, or village for which he was elected or appointed an officer,—see section 617, Compiled Laws of Michigan, 1871.

Before entering upon his duties the health officer should take and subscribe the official oath required by Sec. 1, Art. XVIII. of the Constitution of this State, and file the same in the office of the clerk of the city, village, or township of which he is the Health Officer.

Some of the powers and duties of local boards of health are specified in Chapter 46 of the Compiled Laws of Michigan, 1871. This chapter was constructed more particularly with reference to township boards of health, but section 49 of the same chapter (chapter 35 of the Revised Statutes of 1846, and chapter 46 of the Compiled Laws, 1871) makes it apply to cities and villages. That section is as follows:

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*Printed on pages xxix.-xxxii. of the Fifth Annual Report.

(1740.) SEC. 49. The mayor and aldermen of each incorporated city, and the president and council, or trustees, of each incorporated village in this State, shall have and exercise all the powers and perform all the duties of a board of health, as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers.

In order to dispel any doubts respecting the force and application of this section, the opinion of the Attorney General of the State has been obtained on this subject. His opinion is as follows:

"In reply, I beg leave to say that the officers mentioned in section 1740, Compiled Laws of 1871, are required to carry out, in all respects, the provisions of chapter 46, Compiled Laws, unless the charters of the respective cities and villages have made other provision for guarding the public health. It is impossible to say, in the abstract, how far charter provisions may stand side by side with general enactments, such as chapter 46, Compiled Laws, or how far one may modify the other. Each case must stand upon its own basis. Of course it follows from what I have stated, that a 'health officer' must be appointed in cities and villages whose charter provisions do not conflict with the general law.

"Very respectfully,
"OTTO KIRCHNER, Attorney General."

It is believed that there is nothing in the charter of any city or village in the State that conflicts with the general law which requires the appointment of a Health Officer.

One great object in securing a physician as Health Officer was to enable each local board of health to lead and not, as too frequently heretofore, to follow the people in sanitary knowledge and action. As a rule our physicians are our leading sanitarians, and they know much better than other people what are the sources of danger to the public health in their several localities; and, as a rule, they know best how to avoid those dangers. It is, therefore, for the interest of the people to secure the benefits of that knowledge by paying for the services and advice of the best sanitarian, who will usually be the best physician, in their locality.

If it is true that responsibilities are in proportion to capacities and powers, then a local board of health, which, as in this State, has almost absolute power, must be held responsible for any sickness or death that might have been prevented by a proper use of its legal powers; and an individual Health Officer employed and paid for sanitary advice who does not use the sanitary knowledge of which he is possessed, in a way to make it as effective as possible for preventing sickness and deaths in his vicinity, is especially culpable.

Although as "an executive officer of the board" your power and authority to act will be only that given you by your board, as a "sanitary adviser" you should, and doubtless will, have influence in determining the action of your board, in proportion to your knowledge of sanitary science and your honest effort for the promotion of the public health.

There are many directions in which you can advise your local board of health how to put forth effort for lessening sickness and deaths within its jurisdiction:

I. EPIDEMICS SHOULD BE PREVENTED.—This can generally be done, if local boards of health will but act efficiently in studying out and applying methods which are now practicable. One of the first requisites is that your board shall promptly receive notice of every case of communicable disease. The law makes provision therefor; see sections 1734, 1735, 6852, 6853, and 6855, Compiled Laws of Michigan, 1871. It is especially desirable that the attention of the public in your vicinity be called to the requirements of these sections of the law, and the fact impressed upon their minds that safety from contagious diseases can be secured only by giving prompt notice of the first case of such disease, to the health officer or local board of health, in order that immediate steps may be taken for restricting and suppressing such disease. To complete the provision for such notices is one of the first duties of your board. It is again recommended that your board of health *have a sufficient number of blanks for such notices printed* for the use of *householders* and *physicians* within your jurisdiction, *and distribute them* in order to call attention to the law and secure the material for a complete record in your office and in the office of the clerk of your board. The two sections of law, 1734 and 1735, and summary statements of sections 6852, 6853, and 6855, referred to above, should be printed on the back of each blank. You can also find the form for such blanks for notices on pages 13 and 14 of the First Report, and on pages xiii. and xiv. of the Second Report of this Board, also in amended form on the last sheet of the pamphlet "Circular 25,* Relative to Notices of Diseases which Endanger the Public Health," a copy of which is sent herewith. These blanks can be purchased of W. S. George & Co., Lansing, for one dollar per hundred.

II. COMMUNICABLE DISEASES SHOULD BE RESTRICTED.—When notice or information of the occurrence of a case of a communicable disease reaches the local board, the board should act promptly for the restriction of the disease. The prominent duties in this direction are: (1.) Prompt, thorough, and persistent isolation of the persons sick; (2.) Thorough disinfection of rooms occupied, and of all articles likely to be infected, before allowing their use by other persons;† (3.) As regards small-pox, the vaccination and re-vaccination of all inhabitants.

III. CASES OF DISEASES WHICH ENDANGER THE PUBLIC HEALTH SHOULD BE RECORDED.—Another duty incumbent upon the local board of health, is the recording of the sickness from communicable diseases, and the deaths of citizens and persons under its care; such records to be for local use and also to be reported to this Board, so that, when grouped with records of other localities, the conditions may be studied, and new methods of prevention learned from such unhappy experiences which otherwise will continually be repeated. A form of "Record of Diseases Dangerous to the Public Health" is printed (reduced in size) at the end of this circular. You can procure printed sheets of such a record, on paper 15½ by 19½ inches, of W. S. George & Co., of Lansing, for eighty cents per quire or three dollars per hundred. If desired, the same dealers will bind them at usual prices. It is hoped that hereafter you will, as Health Officer, be prepared and make a record of all important facts concerning "diseases dangerous to the public health," which may come under your observation or be reported to you. Aside from the importance of such a local record, it will enable you, when called upon, to make a full report to this State Board* concerning cases of such diseases.

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* [Printed (reduced in size), on pages xxiii.-xxvii., of this Report.]

† For methods, see pamphlet entitled "Restriction and Prevention of Scarlet Fever," issued by this Board, sent herewith, and also reprinted on pages xxix.-xxxii. of the Fifth Annual Report of this Board. [See also pamphlet, "Restriction and Prevention of Diphtheria," since issued by the Board, and reprinted on pages 86-89 of this (Sixth) Report.]

IV. MUCH SICKNESS AND MANY DEATHS FROM ORDINARY DISEASES SHOULD BE PREVENTED.—A field of labor, perhaps even wider than that with the communicable diseases, is open to your local board of health, namely, the inauguration of measures for preventing sickness and deaths from the ordinary diseases in this State, a very great proportion of which are now believed by our best sanitarians to be preventable. Some of the prominent measures to be inaugurated are: (1.) More thorough drainage of the soil, especially near dwellings; (2.) Better securities against the contamination of the water-supply, particularly in wells, by filth-saturated soil, etc.; (3.) A strict guard over the purity of the air, and freedom from nuisances and unclean places; (4.) Better sanitary and hygienic arrangements and plans in the public schools, and in public buildings and institutions.

The local board of health should be a center of sanitary and hygienic intelligence for its locality; its meetings should not be infrequent, and should be so managed as to secure papers or discussions on special subjects and on the application of the principles of sanitary science to the particular sources of danger in the immediate vicinity, and otherwise to encourage progress in sanitary knowledge among the members of the board as well as among the people. Charged with the duty of guarding the life and health of fellow citizens, the duty of members and officers of boards of health to seek out the best that is known in public hygiene and sanitary methods, seems to be plain.

Many sources of information in sanitary science and public hygiene are now accessible to those who can secure the literature of these subjects. You can doubtless find something of value, without great effort. A knowledge of some of the sources of greatest danger to life in this State may be gained by a study of the Registration Reports on Vital Statistics of Michigan, published by the Secretary of State. These are, or should be, in your township library. About two years ago a pamphlet copy of the Public Health Laws of this State was sent to the health officer of each township, to be delivered to the supervisor if no other health officer was appointed. The first four Annual Reports of this State Board of Health have been sent as issued, and are, or should be, in your township library. Your predecessor in office should pass over to you a copy of the Fourth Annual Report, which was sent to him as Health Officer, with instructions to hand it to his successor. The Fifth Annual Report will soon be ready for distribution, and it is probable that the Secretary of State will soon send copies for each township library. It is expected that a copy will also be sent by this Board to each Health Officer, or to the County Clerks for each Health Officer. You will find something relative to work of local boards of health and health officers on pages 6, 11, 15, 16, 29, and 30 of the First Report; on pages xi.-xv., xxv., and xxviii.-xxix. of the Second Report; on pages xliii.-xlv. and 1-10 of the Third Report; and on pages xxxvi., xxxvii., 6, 7, 11-12, 127, 128, 129, and 130 of the Fourth Report.

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*Act No. 81, Laws of 1873, Sec. 8.—"It shall be the duty of the health physician, and also of the clerk of the local board of health in each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health."

Your local board of health has two kinds of functions: 1, To utilize for your own people the sanitary knowledge already accessible, as indicated in paragraphs I., II., and III., and elsewhere in this Circular; 2, To add to the general stock of such knowledge. You can make additions to sanitary knowledge by original research, by means of records of experience, by means of vital statistics, which supply an important basis for public hygiene, and by reporting to this Board, which will then eventually be able to give to each local board the benefits of the experience of all the others.

It is hoped that you will correspond freely with this Board. Whenever there occurs, in your locality, any outbreak of a communicable or preventable disease, it is expected that you will inquire into, study, and record the conditions coincident with the rise, progress, and decline of any such outbreak, and, besides making the local record, be prepared to make a valuable report to this Board. In case any disease appears in your locality as an epidemic, please send a Special Report of the facts to this office as soon as possible. It is particularly desirable that you study and record the conditions coincident with the rise, progress, and decline of any epidemic. Every such instance of suffering in your locality should be made to yield some valuable data useful for advancing the cause of public health.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

(Please preserve the circulars received from this office.)

RECORD OF CASES OF DISEASES DANGEROUS TO THE PUBLIC HEALTH, WHICH HAVE OCCURRED

RECORD NUMBER.	RECEIVED FOR RECORD.			FULL NAME OF PATIENT.	SEX.	Age in Years, last Birthday.	NAME OF DISEASE.
	Month.	Day.	Year.				

IN THE................OF........................, COUNTY OF........................, STATE OF MICHIGAN.

TAKEN SICK.			WHETHER DIED, LIVING, OR RECOVERED.	DATE OF DEATH OR RECOVERY.			PERSONS WHO FURNISHED THE FACTS FOR RECORD.	
Month.	Day.	Year.		Month.	Day.	Year.	NAME.	P. O. ADDRESS.

The reported source of contagion or infection, in each case, was as follows: For the case recorded as No......it was..............

(Blank sheets of Record, similar to the form here indicated, on paper 15½ by 19½ inches, printed on both sides alike, so as to be found in book form, can be procured of W. S. George & Co., Lansing, Mich., for 80 cents per quire, or $3.00 per hundred. If desired, the same dealers will bind them at usual rates.)

DOCUMENT ON RESTRICTION AND PREVENTION OF DIPHTHERIA.

During the Fall of 1877 and the early part of the Winter following, requests were received for instructions concerning means and methods for the restriction and prevention of diphtheria. The weekly reports of diseases and special communications received from time to time showed that in many parts of the State diphtheria prevailed to such an extent as would make a letter of instructions for its restriction and prevention a matter of general interest, and great utility. Accordingly the subject was brought before the Board at its meeting in January, 1877, and by the Board was referred to Dr. Hitchcock, committee on epidemic, endemic, and contagious diseases, with a request that he prepare such a document. A document was prepared by him, submitted to the Board, amended, approved, and printed. Its distribution has been begun. In order to bring together in one part of the Report all the matter relating to diphtheria, this document has been printed on pages 86–89 of this volume, and it need not be repeated here.

DISSEMINATION OF INFORMATION BY CORRESPONDENCE.

As the interest of the people throughout the State in measures for the restriction and prevention of disease increases, the inquiries received at this office relative to various public health subjects become more frequent. Many of these inquiries are of such a nature that they cannot be answered by any of the general circulars or documents issued by the Board, and a large amount of correspondence is necessary in reply to them.

An instance of the benefits to the people secured by vigorous action of a local board of health, is given in the following correspondence with Dr. Batwell, Health Officer of Ypsilanti, relative to sickness caused by damming the Huron River at Dover. It is printed here as an illustration of what may be accomplished in the way of protecting the lives and health of a community if the people will but enforce the laws provided by the Legislature of the State, and the enactments of incorporated cities and villages. Incidentally this case shows the importance of having a medical man as the executive officer of a local board of health, and the necessity that such medical officer should take the lead in originating and executing measures for the protection of the public health.

YPSILANTI, AUG. 10, 1877.

Secretary State Board of Health:

DEAR SIR:—I beg to submit the following case for your advice and consideration.

The Huron River at all times has been remarkable for the good health that has prevailed along its banks, it being remarkably free from the usual miasmatic diseases that are prevalent along our water courses. This year a large dam has been built at Dover, five miles west of Dexter, and at the bottom of Base Lake, which, when shut down, *entirely drains the river below it*, leaving the bed exposed to the broiling sun and heat which we have had for several weeks. This, of course, has engendered a variety of miasmatic diseases, such as intermittents, remittents, typho-malarial and bilious fevers, besides dysentery and other diseases dependent on malaria. Here we cannot oblige the mill owners to keep their ponds full; for they have not any water to fill them. Otherwise the local board of health is fully equal to the emergency; but the evil exists outside our jurisdiction, and, perhaps, may come under the authority of State Board of Health.

Please to advise me in the matter soon, as it is one requiring prompt action, from some source with the needed authority. * * * * * * * * *

* * * * * * * * * * * * * * * * * All the mills from Dover to the lake are lying idle. I am not, however, influenced by the wail of mill proprietors in seeking through your board a freedom from their troubles; the health of the public is my only concern.

Very respectfully,
EDWARD BATWELL, M. D.,
Health Officer.

A part of the reply which was immediately sent was as follows: "The State Board of Health has no authority to act in the abatement or prevention of nuisances, such as you detail, its functions in this respect being advisory and not mandatory. Your remedy seems to be provided in section 6377 of the Compiled Laws of 1871 (section 86 of the Public Health Laws of Michigan, a copy of which is sent you by this mail), which gives the Circuit Court equity jurisdiction in such matters. If the Court is not in session it is probable that the Judge, off the bench, or the Circuit Court Commissioner, can grant an injunction to stay the nuisance till the case can have a hearing. The section is not applicable if there is a remedy at law; but it does not seem that in this case there is."

Subsequently Dr. Batwell wrote:

DEAR SIR:—In reply to your inquiries relative to the condition of the Huron River, I would state that last year it got so late in the season, before I could get our Board of Health to act in the matter, that the river became high, and the cause of the evil was thus remedied. This year, however, I agitated the subject *early*, and had all the necessary documents prepared to serve the mill owner with an injunction restraining him from raising his dam at Dover, in this county. He did not attempt to do so, and therefore the injunction was not served. There is no question as to our right and power in the premises, and if I had not waited for those equally interested at Ann Arbor, and all along the river above us, I would have stopped the evil last year through our Board of Health in this city. This year we have not suffered from any of the evils entailed by running the river dry two or three days in each week.

Respectfully yours,
Ypsilanti, Dec. 8, 1878. EDWARD BATWELL, M. D.,
Health Physician.

REPORT OF THE SECRETARY RELATIVE TO PROPERTY, ETC., FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1878.

To the President and Members of the Michigan State Board of Health:

GENTLEMEN:—In compliance with section 5 of Article II. of the by-laws of this Board, the following report of the "nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report, and of the property remaining on hand, and also in whose care each item of property is intrusted," is respectfully submitted.

For an account of the instruments and articles of a similar nature, which were on hand at the time of making the last report, you are respectfully referred to pages xl.–liv. of the Fifth Annual Report of this Board. Since that time articles of this class have been purchased as follows:

1 Letter Book,—"F."
1 Step-ladder (6 ft.)

3 Barometers (James Green, Nos. 2340, 2339, 2348.)
3 Barometer boxes.
1 Engraved Block, Aspect chart.
1 Electrotype plate of Aspect chart.
1 Hæma-ramascope.
1 Triangular measuring rule.
1 Type rule (four-sided).
1 Electrotype plate of railroad switch frogs.
1 Letter Book,—"G."
1 Cell Callaud battery.
1 Electrotype plate of log house and surroundings.
1 Seguin's Thermoscope.
1 Seguin's Thermometer.
1 Seguin's Surface Thermometer.
1 Case for the three above-mentioned thermometers.
1 Hicks' Standard Thermometer.
1 Marey's Sphygmograph.

Books and other publications have been received and placed in the library during the year, or previously (by gift) and not heretofore acknowledged, as follows:

BY PURCHASE:
Sanitas Sanitatum et Omnia Sanitas, by Richard Metcalfe, F. S. S.
Sea-Air and Sea-Bathing, by Charles Parsons, M. D.
Encyclopædia Britannica, Vols. VI., VII., VIII.
Uppingham Bye-Laws and Regulations on House Drainage; Explanations and Suggestions by Field.
Model By-Laws for Sanitary Authorities.
Quarterly Returns of Births, Marriages, and Deaths, England, 1877, No. 115.
Robinson and Mellis on Purification of Water-carried Sewage.
Parkin on Remote Cause of Epidemic Disease.
Chambers on Public Health and Local Government.
Report of American Public Health Association, Vols. II., III.
Civil Malpractice, by McClelland.
Germ Theory of Disease, by Maclagan.
Consumption and the Air Rebreathed, by McCormac.
Pneumonia, by Sturgis.
Longevity of Man, by Thoms.
The Dead Body as a Possible Source of Infection, by Vacher.
The Detection of Criminal Abortion and a Study of Fœticidal Drugs, by Van de Warker.
Heredity, Responsibility in Parentage, by Platt.
Preventive Medicine and Public Health, by Carpenter.
The Sphygmograph, by Sanderson.
Forensic Medicine and Toxicology, by Woodman and Tidy.
Sanitary Engineering, by Denton.
Fungi, by Cooke and Berkeley.
Vertebrate Animals, by Jordan.
Lightning Protection, by Spang.
Methomania, by Day.
Till the Doctor Comes, by Hope.
Camp Out, by Gould.

First book of Zoölogy, by Morse.
National (English) Social Science Association, 2 vols., 1875, 1876.
Steam Boiler Explosions, by Colburn.
Ventilation of Buildings, by Butler.
Storage Reservoirs, by Jacob.
The use of the Barometer, by Williamson.
Idiocy, by Seguin.
A Century of American Medicine, by Clark and others.
The Ophthalmoscope, by Browne.
Topographical Anatomy, by Braune.
Hand-Book of Treatment, by Fothergill.
Histology and the Microscope, by Schäfer.
Superstition and Force, by Lea.
Practice of Medicine, 2 vols., by Aitken.
Practitioner's Reference Book, Dunglinson.
Recent Origin of Man, by Southall.
Five Essays by J. K. Mitchell, M. D.
Principles of Psychology, 2 vols., by Spencer.
Diseases of Modern Life, by Richardson.
Forms of Water, by Tyndall.
Agricultural Geology, by W. K. Kedzie.
The Art of Projecting, by Dolbear.
Reports of the Medical Officer of the Privy Council and Local Government Board (England), New Series, No. VIII.
Thirty-sixth Annual Report, Registrar General, of Births, Marriages, and Deaths in England, 1875.
Thirty-seventh Annual Report, Registrar General, of Births, Marriages, and Deaths in England, 1876.
Thirty-eighth Annual Report, Registrar General, of Births, Marriages, and Deaths in England, 1877.
Selected Monographs, by Czermak, Dusch, Schroeder, Van der Kolke, Radicke, Esmarch.
Quarterly Return of Marriages, Births, and Deaths, England, Last Quarter, 1877.
Almanac of Planetary Meteorology, by Mansill.
The Popular Health Almanac, 1877.
National Weather Almanac, by Tice.
Sixth Annual Report of the Local Government Board (England), 1876–77.
Journal of the Congress and Exhibition, Sanitary Institute of Great Britain, Leamington, 1877.
Michigan Almanac, 1878.
Wealth of Nations, by Adam Smith.
Labor in Europe and America, by Young.
Godwin on Population.
Journal of Physiology.
Quarterly Return of Marriages, Births, and Deaths, England. Marriages, Oct., Nov., Dec., 1877. Births and Deaths, Jan., Feb., March, 1878.
Medical Dictionary, by Hoblyn.
House Drainage and Water Service, by James C. Bayles.
Thirty-ninth Ann. Rept. of the Registrar General, of Births, Deaths, and Marriages in England, Abstracts, 1876.

General Report upon Accidents which have occurred on Railways of the United Kingdom (Great Britain) during 1876.
A Bill relative to Drainage and Improvement of Lands, Act 1863 (Ireland).
Report from select committee of House of Lords on Conservancy Boards, 1877.
General abstract of Marriages, Births, and Deaths registered in Ireland during 1876.
Report from select committee on Cattle Plague and Importation of Live Stock.
Royal Commission on the Practice of Subjecting Live Animals to Experiments for Scientific Purposes.
The Future of Sanitary Science, an address by Benj. W. Richardson, M. D.
Physics of the Infectious Diseases, by C. A. Logan, A. M., M. D.
Tables de Mortalité et leur Developpement, by Quetelet.
Quarterly Return of Marriages, Births, and Deaths, England. Marriages, Jan., Feb., March, 1878. Births and Deaths, April, May, June, 1878.
On the Therapeutic Forces, by Dr. Mays.
Statistical Atlas of the United States, by Walker.
U. S. Official Postal Guide for the fiscal year 1877–8.
The Popular Science Monthly, 1878.
Nature, 1878.
The London Practitioner, 1878.
Sanitary Record, 1878.
London Lancet (Monthly), 1878.
Detroit Medical Journal, 1878.
Van Nostrand's Engineering Magazine, 1878.
American Journal of Medical Sciences, 1878.
Medical News and Library, 1878.
Monthly Abstract of Medical Sciences, 1878.
The Sanitarian, 1878.

BY GIFT, EXCHANGE, ETC.:*

From the Secretary of State, Michigan:

First Annual Rept. Cereal Products, Michigan, 1876–7.
Local Acts of Legislature of Mich., 1877.
Public Acts of Legislature of Mich., 1877.
Sixteenth Annual Rept. of the Sec'y Mich. Board of Agriculture, 1876.
The Flags of Michigan.
Sixth Registration Report of the State of Michigan, 2 copies.
Joint Documents of Michigan, 1876, Vols. I., II., III.
Report of Secretary State Board of Agriculture for 1877.
Senate Journal (Mich., 1877), Vols. I., II.
Report of Secretary State Board of Health for 1877.
House Journal (Mich. 1877), Vols. I., II.
Michigan State Pomological Society, Reports for 1876 and 1877.
Laws of Michigan relating to the Support of Poor Persons.

From Herr Becker, Director Imperial Statistical Bureau, Germany:

Vierteljahrshefte zur Statistik des Deutschen Reichs für das jahr 1875, Band XIV., Heft IV., Abtheilung 1.

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* [Documents intended for the library of the Board should be addressed:
LIBRARY OF THE STATE BOARD OF HEALTH,
LANSING, MICH.]

Vierteljahrshefte zur Statistik des Deutschen Reichs für das jahr 1875, Band XIV., Heft IV., Abtheilung 2.
Vierteljahrshefte zur Statistik des Deutshen Reischs für das jahr 1875, Band XIV., Heft. IV., Abtheilung 3.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft I., Abtheilung 1.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft I., Abtheilung 2.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft II., Abtheilung 1.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft II., Abtheilung 2.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft II., Abtheilung 3.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft III., Abtheilung 1.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft III., Abtheilung 2.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft IV., Abtheilung 1.
Vierteljahrshefte zur Statistik des Deutschen Reischs für das jahr 1876, Band XX., Heft IV., Abtheilung 2.
Monatshefte zur Statistik des Deutschen Reischs für das jahr 1877, Jannar-Heft, Band XXV., Heft 1.
Monatshefte zur Statistik des Deutschen Reischs für das jahr 1877, Februar-Heft, Band XXV., Heft 2.
Monatshefte zur Statistik des Deutschen Reischs für das jahr 1877, Marz-Heft, Band XXV., Heft 3.
Monatshefte zur Statistik des Deutschen Reischs für das jahr 1877, April-Heft, Band XXV., Heft 4.
Monatshefte zur Statistik des Deutschen Reischs für das jahr 1877, Mai-Heft, Band XXV., Heft 5.

From Michigan State Board of Health:

Heredity in its Relation to Public Health, by Homer O. Hitchcock, M. D., Reprint from Fifth Annual Report of the Board.
Labelling Medicines, by Prof. R. C. Kedzie. Reprint.
Recreations and the Public Health, by Rev. C. H. Brigham. Reprint.
Report on Healthful Dwellings, by H. F. Lyster, M. D. Reprint.
Rules and Regulations Recommended by the Mich. State Board of Health for adoption by Local Boards of Health, 2 copies.
Illuminating Oils in Michigan, by Prof. R. C. Kedzie; and the Inspection of Illuminating Oils, by Perry Averill, State Inspector. Reprint.
Baths and Bathing, by H. F. Lyster, M. D. Reprint.
Persistence in Efforts to Resuscitate the Drowned, by Prof. R. C. Kedzie. Reprint.
Report of the Proceedings of the Health Department, Am. Social Science Association, by Hon. LeRoy Parker. Reprint.
Small-pox in the city of Detroit, by H. F. Lyster, M. D. Reprint.
Remarks on the Proper Diet for Infants, by Arthur Hazlewood, M. D. Reprint.

Statements concerning the Water-Supply in Michigan. Replies by Correspondents of the State Board of Health. Reprint.
Circular 25, to Supervisors Relative to Diseases which Endanger the Public Health.
Diseases in Michigan during 1876. Replies by Correspondents of the State Board of Health. Reprint.
Circular 28, Relative to the Work of Health Officers and Local Boards of Health in Mich.
Healthy Homes for Farmers, by R. C. Kedzie, M. D. Reprint.
Relative to Erysipelas and Puerperal Fever. Replies by Correspondents of the State Board of Health. Reprint.
Concerning Weekly Reports of Diseases in Michigan, 1877. Reprint.
List of Regular Correspondents of the State Board of Health.
Report of Attendance, etc., of the Am. Public Health Association, 1877, by H. O. Hitchcock, M. D., and Henry B. Baker, M. D. Reprint.
A Special Danger near Switches on Railroad Tracks. A letter from Wm. Worsfold, M. D., with remarks by Henry B. Baker, M. D. Reprint.
Contributions to the Study of the Spread of Diphtheria. Reprint.
Relative to Scarlet Fever. Including Replies by Correspondents to Circular 17. Reprint.
General Plan and Work in the Office of the State Board of Health, Fiscal Year 1876–7. Reprint.
Statement of Facts concerning Cases of Typhoid Fever, etc. Reprint.
Memorial to the Legislature concerning Illuminating Oils; Experiments with Lamps, etc. Reprint.

From the New York Medical Journal Association:
Transactions of the Medical Society of the State of New York for each of the years 1858, 1859, 1860, 1861.
Annual Report of the City Inspector of New York for 1855, 1861.
Report Metropolitan Board of Health, New York, 1866.

From the Smithsonian Institution:
Brazilian Biographical Annual, Vols. I., II., III.
Smithsonian Report, 1876.

From Henry B. Baker:
Typho-malarial Fever, Is it a Special Type of Fever, by J. J. Woodward, M. D., U. S. A.
Heating and Ventilating,—Jenison's Individual System.
Statutes at Large U. S. of A. Forty-Second Congress, 1871–2.
History of Lansing Reform Club.
House's Annual Directory of Homeopathic Physicians in Mich., 1878.

From C. W. Chancellor, M. D.:
Report on the Public Charities, Reformatories, Prisons, and Almshouses, Maryland.
Second Biennial Report State Board of Health, Maryland, Jan. 1878.

From Thomas H. Kearney, M. D.:
Tenth Annual Report of the Health Department of Cincinnati, Ohio.

From Henry B. Peirce:
General Laws and Resolves passed by the Legislature of Massachusetts, 1877.
Massachusetts House of Representative Document No. 341.

From S. A. Lattimore, LL. D.:
The Relations of Typhoid Fever to Contaminated Well-water, Prof. Lattimore's Report.
From A. W. Fisher, M. D.:
Synopsis of the History of the Toledo Board of Health, 1877.
From Charles O. Hunt, M. D.:
Maine Medical Association, Transactions of 1877, Vol. VI., Part I.
From B. H. Riggs, M. D.:
Transactions of the Alabama Medical Association, 1877.
From J. Berrien Lindsley, M. D.:
Report of Nashville Board of Health, 1877.
From J. L. Mears, M. D.:
Report of Health Officer of San Francisco, Cal., 1877.
From Prof. Burt G. Wilder, M. D.:
Emergencies and How to Meet Them.
From Elisha Harris, M. D.:
Report on Laws, Provisions, and Methods for Securing General Vaccination.
From Charles E. Smith:
Annual Report, Village of Kalamazoo, 1877.
From J. T. Reeve, M. D.—
Transactions Wisconsin State Medical Society, 1877.
Second annual Report Wisconsin State Board of Health, 1877.
From S. L. Boardman—
Annual Report Maine Board of Agriculture, 1876.
From Albert L. Gihon, A. M., M. D.—
Medical Essays: Compiled from Reports to the Bureau of Medicine and Surgery by Medical Officers of the U. S. Navy.
From F. W. Hatch, M. D.—
Biennial Report of California State Board of Health, 1876 and 1877.
Report on Public Hygiene and State Medicine.
From Davenport (Iowa) Academy of Natural Sciences—
Proceedings Davenport Academy of Natural Sciences, Vol. 1867–1876, and Vol. II., part 1.
From L. C. Marsh & Co.—
Catalogue of Exhibition of Sanitary Appliances, etc., Leamington, Oct., 1877.
From Dr. Henry Tuck—
Thirtieth Annual Rept. Mass. School for Idiotic and Feeble-minded Children, 1877.
From Dr. H. S. McMaster—
Transactions Michigan State Eclectic Medical and Surgical Society, 1877.
From J. L. Cabell, M. D.—
Etiology of Enteric Fever.
From J. G. Cabell, M. D.—
Annual Report, Board of Health, of Births, Marriages, and Deaths in Richmond, Va., 1877.
From Isaac N. Kerlin. M. D.—
Twenty-fifth Annual Rept. Pennsylvania Training School for Feeble-minded Children.
From Surgeon General, U. S. N.—
Report of the Surgeon General of the U. S. Navy, 1877.

From State Inspector of Illuminating Oils—
First Annual Report Michigan State Inspector of Illuminating Oils, 1877, 2 copies.
From H. A. La Fetra—
Report Board of Health City of Brooklyn, N. Y., 1875–1876, 2 copies.
From C. H. Porter, M. D.—
Transactions New York State Medical Society, 1877.
From Wirt Johnston, M. D.—
First Annual Report Miss. State Board of Health, 1877.
From J. K. Barnes, M. D.—
Approved Plans and Specifications for Post Hospitals. Circular No. 10, Surgeon General U. S. A.
From Arthur J. Payne, M. D.—
Quarterly Report Health Officer, Calcutta, for the last Quarter, 1877.
Report of the Health Officer of Calcutta, 1877.
From D. C. Jacokes, LL. D.—
Report Commissioner of Education Centennial Exposition.
Report State Board Centennial Managers.
From S. B. Boyd, M. D.—
Fourth Annual Report of the City Physician, Knoxville, Tenn.
From Brock L. McVickar—
Report Department of Health, Chicago, Ill., 1877.
From Robert Lebby, M. D.—
Annual Report City Registrar, Charleston, S. C., 1877.
From S. S. Gray, M. D.—
Transactions Ohio Medical Society for 1877.
From Charles A. Lindsley, M. D.—
Fifth Annual Report New Haven Board of Health, 1877.
From Ezra M. Hunt, M. D.—
Report New Jersey Board of Health, 1877.
From S. H. Row—
Report of the Michigan Insurance Bureau, Dec. 31, 1877.
From Thos. L. Neal, M. D.—
Report Board of Health, Dayton, Ohio, 1877.
From L. W. Bailey—
Report Health Department of Cleveland to the Police Commissioners.
From John E. Addicks—
Health Officer's Annual Report, Philadelphia, 1877.
Addenda to Health Officer's Annual Report, Philadelphia, 1877, "House and Street Drainage."
From George E. Ranney, M. D.—
Transactions Mich. State Medical Society for the years 1877, 1878.
Legal Relations of Insane Patients, by Foster Pratt, M. D.
From W. Murray Weidman, M. D.—
Report Board of Health, City of Reading, Penn., 1877.
From L. C. Butler, M. D.—
Nineteenth Registration Report of Vermont, 1875.
From Hon. M. S. Brewer—
An Act to Prevent the Introduction of Contagious or Infectious Diseases into the United States. (Public, No. 41.)

From W. H. Geddings, M. D.—
Meteorology in the Service of Medicine, by Dr. J. Schreiber.
From H. S. Hudson, M. D.—
Eighth Annual Report to the Board of Health of Selma, Ala., 1877.
From J. Stopford Taylor, M. D.—
Report of the Health Officer of Liverpool, 1877.
From J. A. Russell—
Sanitary Houses, Two Lectures to Builders and Plumbers, by J. A. Russell, M. A., M. B., etc.
From C. W. Chamberlain,—
Restriction and Prevention of Diphtheria, issued by the Connecticut State Board of Health, 1878.
Proceedings of the Connecticut Medical Society, 1878.
From Church, Gleason, Collier, and Kedzie—
Holy Bible.
From Chief Signal Officer—
Report of the Chief Signal Officer, U. S. A., 1877.
From Dr. Victor Böhmert—
Zeitschript des K. Sächsischen Statistischen Bureaus XXII., Jahrgang 1876, Heft I. und II.
Zeitschript des K. Sächsischen Statistischen Bureaus XXII., Jahrgang 1876, Heft III. und IV.
Zeitschrift des K. Sächsischen Statistischen Burean's XXIII. Jahrgang 1877, Heft I. und II.
Zeitschrift des K. Sächsischen Statistischen Bureau's XXIII. Jahrgang, 1877, Heft III. und IV.
From W. G. Regester, M. D.—
Transactions of the Medical and Chirurgical Faculty of Maryland, April, 1878.
From S. D. Pond—
Proceedings Michigan State Fireman's Association, 1878.
From J. R. Weist, M. D.—
Transactions Indiana State Medical Society, 1877.
From Robert Moore—
Report of the Sewer Commissioner, St. Louis, Mo., 1878.
First Annual Report of the Health Commissioner, St. Louis, Mo., 1878.
From Wm. Smith, M. D.—
Transactions New York State Medical Society, 1878.
From Wm. H. Van Buren, A. M., M. D.—
Report of Building Committee New York Hospital.
From —— ——,
Transactions Pennsylvania Medical Society, 1877.
Reports Trustees and Resident Officers Maine Insane Hospital, 1877.
One Hundred and Eighth Annual Report New York Hospital and Bloomingdale Insane Asylum.
An Act to provide for the Appointment of a State and Deputy Inspectors of Illuminating Oils in Ohio. Passed 1878.
Rules and Regulations recommended by the Michigan State Board of Health and Adopted by the Tecumseh Board of Health, July, 1877.
Sixth Annual Report of the Board of Health of the City of Boston, Mass., for the year ending April 30, 1878.

Eighth Annual Report of the City Registrar of Albany, N. Y., for year ending April 30, 1878.

Received in Exchange for Publications of this Board,—the following Periodicals (in some instances incomplete volumes):—

Health Reformer.
Virginia Medical Monthly.
The Plumber and Sanitary Engineer.
Insurance Agents and Brokers Magazine.
Ohio Medical and Surgical Journal.
Herald of Health, Bloomington, Ill.
American Medical Bi-Weekly.
Chicago Medical Journal and Examiner.
Michigan Medical News.
Canada Lancet.
Ohio Medical Recorder.
Scientific Farmer.
North Carolina Medical Journal.
American Observer.
American Exchange and Review.
Cincinnati Lancet and Clinic.
Druggists' Circular and Chemical Gazette.

Weekly or monthly mortality statements have been received, with greater or less regularity, during the past year, from Health Officers, Registrars, and officers of Boards of Health in cities in the United States, as follows:

A. W. Fisher, M. D., Health Officer, Toledo, Ohio.
Thos. C. Minor, M. D., Health Officer, Cincinnati, Ohio.
Thos. L. Neal, M. D., Health Officer, Dayton, Ohio.
Frank Wells, M. D., Health Officer, Cleveland, Ohio.
Guy B. Case, M. D., Health Officer, Cleveland, Ohio.
Edwin M. Snow, M. D., Supt. Health, Providence, R. I.
Charles F. Folsom, M. D., Secretary State Board of Health, Boston, Mass.
D. W. Bliss, M. D., Registrar Board of Health, Dist. C., Washington, D. C.
Smith Townshend, M. D., Health Officer, District of Columbia, Washington, D. C.
T. S. Scales, M. D., Health Officer, etc., Mobile, Ala.
W. Murray Weidman, M. D., President Board of Health, Reading, Pa.
J. Berrien Lindsley, M. D., Health Officer, Nashville, Tenn.
J. G. Cabell, M. D., President Board of Health, Richmond, Va.
J. L. Meares, M. D., Health Officer, San Francisco, Cal.
F. W. Hatch, M. D., Secretary City Board of Health, Sacramento, Cal.
W. E. Harwood, M. D., Health Officer, Petersburgh, Va.
W. H. Shepherd, M. D., Health Officer, Norfolk, Va.
C. A. Lindsley, M. D., Health Officer, New Haven, Conn.
O. C. DeWolf, M. D., Commissioner of Health, Chicago, Ill.
I. H. Stearns, M. D., Health Officer, Milwaukee, Wis.
A. S. Baldwin, M. D., Chairman Com. Vital Statistics, Jacksonville, Fla.
Robert Lebby, M. D., City Registrar, Charleston, S. C.
George S. Pelzer, M. D., Registrar Vital Statistics, Charleston, S. C.
H. P. Wright, Registrar Vital Statistics, Chicago, Ill.
J. H. Van Deman, M. D., Secretary Board of Health, Chattanooga, Tenn.
S. B. Boyd, M. D., City Physician, Knoxville, Tenn.

A. M. French, M. D., City Physician, Knoxville, Tenn.
L. W. Bailey, M. D., Secretary Health Dept., Cleveland, Ohio.
W. P. Reese, M. D., Registrar, Selma, Ala.
H. S. Hudson, M. D., Registrar Vital Statistics, Selma, Ala.
Will Hague, Registrar Vital Statistics, Paterson, N. J.
James G. Hunt, M. D., Health Officer, Utica, N. Y.
Charles Buckley, M. D., Health Officer, Rochester, N. Y.
Edward Tobie, M. D., Health Officer, Buffalo, N. Y.
Francis H. Stuart, M. D., Registrar Records and Vital Statistics, Brooklyn, N. Y.
R. M. Wyckoff, M. D., Register of Records, Brooklyn, N. Y.
Walter DeF. Day, M. D., Sanitary Supt. and Registrar, N. Y. City.
John T. Nagle, M. D., Deputy Registrar Records, N. Y. City.
G. B. Balch, M. D., Health Officer, Yonkers, New York.
Elisha Leach, M. D., Health Officer, Detroit, Mich.
W. Snively, M. D., Health Officer, Pittsburg, Pa.
Jno. C. Baylor, M. D., Health Officer, Norfolk, Va.
T. H. Kearney, M. D., Health Officer, No. 10 City Building, Cincinnati, O.
J. B. Trembley, M. D., Oakland, Cal.
Brewer Mattocks, M. D., President Board of Health, St. Paul, Minn.

Weekly or monthly mortality statements, which have not hitherto been acknowledged, were received previously to the fiscal year 1878, from most of the above-named officers of Boards of Health, and from the following:

Dr. C. T. Thayer, Health Officer, Burlington, Vt.
Henry Gibbons, Jr., M. D., Health Officer, San Francisco, Cal.
W. M. Wilson, M. D., Health Officer, Norfolk, Va.
J. J. Quinn, M. D., Health Officer, Cincinnati, O.
Elisha Harris, M. D., Registrar, N. Y. City.
Alex. B. Tadlock, M. D., City Physician, Knoxville, Tenn.
J. H. Carstens, M. D., President Board of Health, Detroit, Mich.
James Johnson, M. D., Health Officer, Milwaukee, Wis.
James W. Morton, M. D., Health Officer, Nashville, Tenn.
John H. Claiborn, M. D., Health Officer, Petersburgh, Va.
Samuel R. Dean, Registrar Vital Statistics, Paterson, N. J.
S. L. Jepson, M. D., Health Officer, Wheeling, West Va.
W. T. Goldsmith, M. D., President Board of Health, Atlanta, Ga.
George E. Sherman, M. D., Health Officer, Oakland, Cal.
Granville P. Conn, M. D., Health Officer, Concord, N. H.
Dr. Herbert M. Nash, President Board of Health, Norfolk, Va.
T. A. Means, M. D., Health Officer and Registrar, Montgomery, Ala.

Quarterly and other mortality statements have also been received from Arthur J. Payne, M. D., Health Officer, Calcutta, East India; S. W. North, M. D., Health Officer, York, England; J. B. Russell, M. D., F. R. P. S., Health Officer, Glasgow, Scotland; and J. S. Taylor, M. D., Health Officer, Liverpool, England.

The Weekly Bulletin, issued under the National Quarantine Act, by Jno. M. Woodworth, M. D., Surgeon General U. S. Marine Hospital Service, Washington, D. C., has been regularly received since its establishment.

Excepting certain publications drawn out by members of the Board, the foregoing, together with those accounted for as in the library of the Board, and those drawn out by members, at the date of the last Report, are in the library of the Board, and are in good condition. Those drawn out and not yet returned are as follows:

By Prof. R. C. Kedzie—
- Tenth Ann. Rept. Milwaukee Board of Health, 1876.
- Communications of the R. I. Medical Society, 1876-77.
- Sanitary Record, June 28, 1878.

By Homer O. Hitchcock, M. D.—
- Memoirs on Diphtheria, by Trousseau and others.
- Public Health, by Parkes.

By Henry F. Lyster, M. D.—
- Elkington on Drainage.
- Reid on Ventilation.
- Maintenance of Health, by Fothergill.
- Separate System of Drainage, by Monson.
- Public Health, June 9, 1876.
- Hygiea, a City of Health, by Richardson.
- Lectures on State Medicine, by de Chaumont.
- Public Health and Local Government, by Chambers.
- Report Public Health Association, Vols. II. and III.
- Germ Theory of Disease, by Maclagan.
- Longevity of Man, by Thoms.
- Preventive Medicine and Public Health, by Carpenter.
- Sanderson on the Sphygmograph.
- Sanitary Engineering, by Denton.
- Cooke and Berkeley on Fungi.
- National (English) Social Science Association for 1875, 1876.
- Diseases of Modern Life, by Richardson.
- Transactions American Public Health Association, Vol. I.
- Blythe on Public Health.
- Health and its Conditions, by Hinton.
- Sanitas Sanitatum et Omnia Sanitas.
- Parkes' Hygiene.

By Hon. LeRoy Parker—
- Detroit Lancet for January, 1878.
- Responsibility in Mental Diseases.
- Civil Malpractice, by McClelland.

By Henry B. Baker, M. D.—
- Nature for August 15, 1878.

By Rev. J. S. Goodman—
- Report Relative to Public Schools, Philadelphia, 1875.

Of hard paper there was on hand at the time of making the last report, 6 reams and 32 sheets of folio post, 273 sheets of crown, 2 reams and 270 sheets of demy, 297 sheets of blue cover paper, 267 sheets of green cover paper, and about 1 ream and 450 sheets manilla wrapping paper. Since that time there have been purchased 18 reams folio post, 10 reams crown, 3 reams green cover paper, 500 sheets of bond paper, and 120 sheets of blotting paper. There is now on hand 18 reams and 92 sheets of folio post, 283 sheets of crown, 368 sheets of demy, 267 sheets of blue cover paper, 1 ream green cover paper, 160 sheets manilla wrapping paper, and 45 sheets blotting paper, besides a quantity of blotters. This shows that during the year there have been used 5 reams and

420 sheets of folio post, 9 reams and 470 sheets of crown, 1 ream and 582 sheets of demy, 30 sheets of blue cover paper, 2 reams and 267 sheets of green cover paper, 1 ream and 290 sheets of manilla wrapping paper, 500 sheets of bond paper, and 75 sheets of blotting paper.

This has been used as follows: The folio post has been used in making circulars, blanks, and printed letters. The crown has been used for making blank meteorological registers, blanks for record of diseases dangerous to the public health, and for making letter paper. The demy was used for making a new "record-of-distribution" book, an index book, blank notices to physicians and householders to report cases of diseases dangerous to the public health, and lists of correspondents. The bond paper has been used for letter paper, the blue cover paper for covering records of prevailing diseases, the green cover paper for making covers to reprints from the Annual Reports, and the manilla wrapping paper for wrapping documents sent out from the office. The specific items for which the hard paper has been used may be found in detail in the "Order Book" of this office.

Of writing paper there was on hand at the time of making the last report, about 2,840 sheets and half-sheets printed note and letter, 414 sheets legal cap, 312 sheets plain letter, and 384 sheets foolscap. Since that time there have been purchased 1 ream plain letter, 1 ream foolscap, and there have been manufactured from crown and bond paper furnished by this office 3,625 sheets and half-sheets letter paper with printed heads. Letter paper has been issued during the year as follows: to Prof. R. C. Kedzie, 168 whole sheets; to H. O. Hitchcock, M. D., 340 sheets letter and 144 sheets legal cap; to H. F. Lyster, M. D., 223 sheets letter; to Hon. LeRoy Parker, 124 sheets letter and 24 sheets legal cap. There is now on hand about 3,139 sheets and half-sheets printed note and letter, 1 ream plain letter, 162 sheets legal cap, 1 ream and 90 sheets foolscap. This shows that about 4,161 sheets and half-sheets of writing paper of different sorts have been used in this office.

Of envelopes there was on hand, at the time of making the last report, about 22,735; 39,000 have been purchased since, making a total of 61,735. There are now on hand about 32,614, thus showing that about 29,121 have been used during the year. About 1,759 of these were used in sending Circular 28 to health officers of local boards of health, to all the newspapers in the State, and to sanitary journals; about 8,600 were used in sending Circular 25 to each physician, newspaper, township clerk, and justice of the peace in the State; about 2,442 were used in sending Circular 22 and Form F, with an envelope printed for return, to health officers of local boards of health; about 2,442 for sending Circular 23 and Form H, with envelope printed for return, to clerks of local boards of health; about 2,976 for sending Circular 26 with Form E, with envelope printed for return, to supervisors and clerks; about 1,000 were issued to members of the Board; about 1,500 were used in sending reprints, blanks for weekly reports of diseases, circulars, etc. to correspondents. The remainder has been used in sending out smaller lots of the above mentioned and of other documents, and in carrying on the ordinary correspondence of the office.

At the date of the last report there was on hand postage stamps, etc., to the amount of $98.73. Vouchers for postage and box-rent have been allowed during the year to the amount of $514.66, making a total of $613.39. There is now on hand postage stamps, unused postal cards, and postage money to the amount of $84.45. This shows that during the year the cost of postage and box-rent has been $528.94.

Some of the principal items of postage have been as follows:

Sending out Circulars 25 and 28	$117.20
Sending out Sixth Registration Report	59.69
Sending out Annual Reports, about	60.00
Stamped envelopes sent to Meteorological Observers, etc.	10.00
For postal cards, printed for reporting diseases, and for receipts to and from this office, etc.	57.00
	$303.89

Thus far this report has given, in most instances with exactness, in a few approximately, the amount of each kind of property received, on hand, and disposed of, by this office, during the year ending Sept. 30, 1878; but in order to show how much has been expended for all items of property and for all other purposes during the time specified, the following statement is here presented. It includes vouchers numbers 289 to 371 inclusive:

AMOUNT OF EXPENDITURES BY THE STATE BOARD OF HEALTH, AS PER VOUCHERS NUMBERS 289 TO 371 INCLUSIVE.

Chemical Analyses,		$10.00
Engraving, Drawing, etc.,		27.50
Expenses of Members,	Attending Meetings,	149.88
	Other Official,	177.15
Instruments and Books,		430.35
Paper, Stationery, etc.,		292.50
Postage,	Office,	514.66
	Members,	9.68
Printing and Binding,		707.99
Secretary,		2,000.00
Special Investigations,		23.54
Miscellaneous,		56.95
Total,		*$4,400.20

Respectfully submitted,

HENRY B. BAKER,
Secretary.

ENDORSEMENT ON THE FOREGOING REPORT, BY THE FINANCE COMMITTEE OF THE BOARD.

Having compared the Secretary's Annual Report of Property received, issued, expended, and destroyed during the fiscal year ending Sept. 30, 1878, with the property book kept in the office of the State Board of Health, and with the record of proceedings; and having examined the foregoing account of expenditures, and compared the same with the books in the Auditor General's office, I find the same to be correct. The difference of $2.30 between the account of vouchers allowed by the Board and the account of money paid, as appears on the books of the Auditor General's office, is owing to the fact that vouchers 358 and 361, amounting to $2.30, were not paid till after the close of the fiscal year.

LEROY PARKER,
Committee on Finance.

LANSING, Oct. 9, 1878.

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*This is for the fiscal year; the amount for the calendar year cannot exceed $4,000, the total appropriation for each calendar year.

ABSTRACTS AND BRIEF ACCOUNTS OF THE PROCEEDINGS AT THE MEETINGS OF THE STATE BOARD OF HEALTH DURING THE YEAR ENDING SEPT. 30, 1877.[*]

REGULAR QUARTERLY MEETING, OCT. 9, 1877.

The Board met at 9 A. M., in the office of the Secretary of State, at Lansing, the following members being present: Prof. R. C. Kedzie, President; Hon. LeRoy Parker; Rev. D. C. Jacokes; and Henry B. Baker, M. D., Secretary.

The minutes of the last meeting were read and approved.

Dr. Kedzie reported that his investigations for the State Board of Agriculture concerning different kinds of wheat had prevented the completion of his report on Water Analysis. Further time was granted and the request of the Board for the paper was continued.

Rev. D. C. Jacokes said that he would make experiments in Heating and Ventilation and report at some future time.

At 9:30 A. M., Drs. Homer O. Hitchcock and Henry F. Lyster came in and took their seats as members of the Board.

Dr. Kedzie read a report on "Labelling Medicines," which was accepted and ordered published in the Annual Report. [See pages 21–26 of the Fifth Annual Report.]

After considerable discussion as to the best way of dealing with the subject of misplaced bottles in drug stores, dispensing of wrong medicines, etc., it was voted that a committee be appointed to confer with the Michigan Pharmaceutical Association, and report to this Board on the general subject of poisoning by means of misplaced bottles and through other mistakes in drug stores. Drs. Kedzie and Lyster were appointed such a committee.

On motion, the tables and diagrams prepared by Dr. Baker for his report on the "Death-rate as Influenced by Age, Climate, etc." were presented and explained, and he was authorized to add such notes and comments as he might prepare, and publish the whole in the next Annual Report, if found practicable.

Hon. LeRoy Parker, Committee on Legislation, reported that Act No. 56[†], Laws of Michigan, 1877, amends section 1693[†] of the Compiled Laws of 1871 in such a way that in connection with section 1740[‡], Compiled Laws of 1871, it requires the appointment of a health officer by city and village boards of health, and the return to the Secretary of the State Board of Health of the name and post-office address of the health officer. The opinion of the Attorney General[§], had been obtained, and it confirmed this interpretation of the law.

Hon. LeRoy Parker, Committee on Finance, reported that he had compared the books of the office of the Secretary of the Board with the books of the Auditor General's office and had found them correct.

Dr. Lyster read a paper on "Healthful Dwellings," which was accepted for publication in the Annual Report. [See pages 47–67 of the Fifth Annual Report.] In the discussion which followed the reading of the paper, Dr. Baker suggested that house drains should not have uninterrupted connection with the sewer, but should have an open-air space or a well-ventilated space between the drain and sewer. Dr. Kedzie suggested that box-drains should be placed with one corner down, so that a small quantity of water would wash out the sediment.

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[*] Regular meetings occur on the second Tuesday of January, April, July, and October in each year.

[†] See page xv. of this Report.

[‡] Section 1740 is printed on page xxix of this Report.

[§] This opinion was published in Circular 20; and also in Circular 28, pages xxviii.-xxix. of this Report.

On motion, the request of the Board that Dr. Kedzie complete the investigation of the subject of poisonous cheese was continued.

Dr. Kedzie read a report on "Persistence in Efforts to Resuscitate the Drowned," which was accepted for publication in the Annual Report. [See pages 131–142 of the Fifth Annual Report.]

At the afternoon session, the following members were present: Drs. Kedzie, Hitchcock, and Lyster, Hon. LeRoy Parker, Rev. D. C. Jacokes, and Henry B. Baker.

The Secretary read a part of the annual report of Work in the Office, and was directed to complete the report and publish it in the Annual Report of the Board.

The Secretary presented the report of Perry Averill, State Inspector of Illuminating Oils, completing his report for the year ending July 31, 1877. The report for the whole year was ordered published in the Annual Report. [See pages 85–90 of the Fifth Annual Report.]

It was voted that the address on Illuminating Oils, delivered by Dr. Kedzie before the Legislature in January, 1877, be published in the Fifth Annual Report, and, in connection therewith, the present law on Illuminating Oils. [See pages 69–83 of the Fifth Annual Report.]

Further time was granted to the Committee on Legislation in which to consider the subject of uniform general laws respecting boards of health in cities and villages and their relations to the State Board of Health.

Hon. LeRoy Parker read a report of the proceedings of the Health Department of the American Social Science Association at the meeting in September, 1877, which was accepted for publication in the Fifth Annual Report. [pages 91–98.]

Concerning the subject of ventilation, Dr. Kedzie spoke in commendation of the plan of securing an upward current in foul-air shafts by means of gas jets and lamps.

Dr. Hitchcock reported that he had been unable to attend the meeting of the Association for the Cure of Inebriates, as had been requested by the Board. He presented his report of attendance of the American Public Health Association in September, 1877, which was accepted for publication in the Annual Report. The report not including the proceedings of the third day, Dr. Baker was directed to complete it for that day. [See pages 449–457 of the Fifth Annual Report.]

Further time was given to the Committees on Legislation and on Contagious Diseases, jointly, to consider the subject of action for securing notices of diseases dangerous to the public health by physicians and householders, in accordance with the present law.

Dr. Hitchcock read his annual address as President of the Board, due at the April meeting, 1877, entitled "Heredity in its Relations to Public Health and to Legislation in the Interests of Public Health." It was accepted for publication in the Annual Report. [See pages 1–19 of the Fifth Annual Report.]

The Secretary read a list of names of persons proposed as regular correspondents of the Board. The persons named were approved and the Secretary was authorized to ask them to serve.

The Secretary presented a communication from Dr. G. W. Topping, of De Witt, relative to weekly reports of diseases, which he was authorized to publish in the Annual Report. [See page 247 of the Fifth Annual Report.]

A communication from Dr. Edward Dorsch, of Monroe, relative to lead-poisoning from use of domestic utensils made of tin-plate, was referred to Dr. Kedzie. [See page 28 of this Report.]

A communication from Dr. C. W. Marvin, of Ithaca, Gratiot Co., relative to the possibility of the causation of cancer by the use of tomatoes as food, was referred to Dr. Hitchcock. [For results of investigation on this subject, see pages 33–38 of this Report.]

A communication from Dr. J. D. Hull, of Bravo, relative to inspection and advice concerning drainage in his locality, was referred to Dr. Lyster.

The Secretary was authorized to publish in the Annual Report Dr. J. S. Caulkins' report of an outbreak of diphtheria at Rochester, Oakland county. [See pages 381–390 of the Fifth Annual Report.]

The Secretary presented a communication from Charles H. Fisher, M. D., of North Scituate, R. I., relative to sulpho-carbolate of soda, its formula, and its first use as a preventive and as a remedy in scarlet fever.

Dr. Baker presented a proposed amendment to the law for transmission of names of county officers to the State Department, the object of the amendment being to secure the names and addresses of coroners throughout the State. It was referred to Hon. Le Roy Parker, Committee on Legislation in the Interests of Public Health.

Communications from Rev. C. H. Brigham, relative to his health and to the prospect of his attendance on meetings of the Board, were read and placed on file.

The Secretary presented a communication from Edward Batwell, M. D., health officer of Ypsilanti, relative to the damming of the Huron River at Dover, drying the river-bed and thereby causing dysentery, etc., at Ypsilanti. [See pages xxxiv.–xxxv.]

The Secretary was directed to expend the balance of the appropriation in the purchase of books and instruments.

The Secretary was authorized to publish in the Annual Report the replies by correspondents to the letter of inquiry relative to Erysipelas and Puerperal Fever. [See pages 345–350 of the Fifth Annual Report.]

The Secretary was authorized to procure not to exceed 200 reprints of each article in the Annual Report.

A communication from A. L. Bours, Secretary of the Board of State Building Commissioners, relative to rooms for the State Board of Health in the new capitol was read, and Mr. Parker and Drs. Kedzie and Baker were, on motion, asked to take such steps as they should see fit in order to secure proper rooms.

The Secretary presented a paper by Dr. Arthur Hazlewood, of Grand Rapids, on "Infant Diet," which was accepted for publication in the Annual Report. [See pages 99–104 of the Fifth Annual Report.]

Bills were audited—vouchers 289–310 inclusive.

Dr. Lyster presented a paper on "Baths and Bathing," which was accepted for publication in the Annual Report. [See pages 111–130 of the Fifth Annual Report.]

Dr. Baker offered the following resolution:

"*Resolved*, That the resolution requiring the printing of any circular at any time for any member of the Board, as a committee, be so modified that any such circular shall first be submitted to the members of the Board for suggestions and for approval or disapproval; and that if a majority do not approve of issuing such a circular, the Secretary shall not be authorized to order it printed."

The foregoing resolution was adopted, and then was reconsidered and laid on the table.

The Secretary presented his annual report of property purchased, issued, used, destroyed, and remaining on hand. It was referred to the Committee on Finance.

The Secretary was directed to supply each member of the Board with a list of the names and addresses of the regular correspondents of the Board.

The Secretary read a report of work in the office during the last quarter, which was accepted and placed on file.

On motion, the Board adjourned.

REGULAR QUARTERLY MEETING, JAN. 8, 1878.

The Board met at 9 A. M., in the office of the Secretary at Lansing, the following members being present: Robert C. Kedzie, M. D., President; Hon. LeRoy Parker; Rev. D. C. Jacokes; and Henry B. Baker, Secretary.

The minutes of the last meeting were read and approved.

Dr. Kedzie mentioned some experiments relative to the permeability to air of walls of buildings and of clothing, and to the effect of this condition on the health of those who wear the clothing and live in the houses. These experiments had been made in the preparation of an address on "Healthy Homes for Farmers" to be read at the Farmers' Institutes. Rev. D. C. Jacokes moved that 6,000 copies of this address be reprinted from the Report of the State Board of Agriculture, and distributed by this Board. This motion was laid on the table, and at the afternoon session was carried.

Dr. Kedzie reported experiments in detection of lead in tin utensils, giving a simple test for detection of lead in tin. [See page 29 of this Report.] He found that about three-fourths of all the specimens examined contained lead in considerable quantity. He would report at some future time on Dr. Dorsch's communication.

Dr. Kedzie mentioned cases of sickness apparently due to bad water, a sample of which had been sent to him for examination.

Hon. LeRoy Parker read a report relative to a proposed amendment to the law requiring from county clerks a return to the Secretary of State of names of persons elected to the Legislature and of county officers. The report recommended that section 87 of the Compiled Laws of 1871 be so amended as to require a return of the post-office addresses as well as of the names of persons elected to the Legislature and of county officers, in order that the Secretary of State and the State Board of Health may more readily communicate with such officers, and more especially that the State Board of Health may communicate with coroners respecting sudden deaths which occur in their localities. The report was accepted and adopted and Mr. Parker was asked to prepare a bill and bring the subject before the Legislature at its next session.

Hon. Le Roy Parker reported that section 6852, Compiled Laws of 1871, make it the duty of the township supervisor to prosecute for violations of sections 1734 and 1735, relative to notices by householders and physicians of cases of diseases dangerous to the public health. The report was accepted and

Mr. Parker and Dr. Baker were appointed a committee to prepare a circular to supervisors calling their attention to the law. [See pages xxiii.–xxvii. of this Report.] The report by Mr. Parker showed that there is an uncertainty as to whose duty it is to prosecute for violations of these sections of law in cities and villages, and, on motion, Mr. Parker was requested to draw up a bill designed to make this the duty of the health officer of the city or village.

Dr. Baker was requested to prepare for the Committee on Legislation a statement of points on which it is desirable to amend the law in order to secure uniform provisions, relative to diseases which endanger the public health in townships, cities, and villages.

Hon. LeRoy Parker, Committee on Finance, presented a report relative to the Secretary's annual report of property. On motion, Mr. Parker's report was adopted and ordered printed in the Annual Report for 1877. [See page liv. of the Fifth Annual Report.]

Hon. Le Roy Parker reported correspondence relative to the Massachusetts law concerning coroners and coroners' juries. On motion, he was requested to continue the investigation and report at some future time. [For his paper on this subject see the last article of this Report.]

Dr. Kedzie reported action relative to securing proper rooms in the new capitol.

The Secretary read a report of work in the office during the last quarter.

The Secretary presented plans for the fixed furniture in the rooms of the Board in the new capitol.

The Secretary presented a proposition made by Prof. W. J. Beal, of the Agricultural College, in behalf of the State Pomological Society, relative to coöperation by the State Board of Health with the Pomological Society in establishing meteorological stations at certain points where the Board has now no stations. The proposition was laid on the table.

On motion, the Secretary was authorized to place the three barometers recently purchased by the Board, where the observations by means of them will be of most value.

On motion, the Secretary was authorized to purchase for the Board a Pond's sphygmograph.

On motion, the President and Secretary were appointed a committee to revise the Rules and Regulations recommended by the Board for use of local boards of health, with a view to publishing a new edition.

At the beginning of the afternoon session the same members were present as in the morning; viz., Dr. Kedzie, Hon. LeRoy Parker, Rev. D. C. Jacokes, and Henry B. Baker.

Bills were audited—vouchers 311–336 inclusive. During the auditing of bills, Henry F. Lyster, M. D., came in and took his seat as a member of the Board.

On motion of Rev. D. C. Jacokes, Dr. Kedzie was requested to prepare a summary and revision of his articles on ventilation for publication in the Sixth Annual Report, with a view to a general distribution of reprints of the same.

Dr. Lyster presented a note which he desired to add to his communication on "Small-pox in Detroit," then in type. Permission to add the note was granted. [See page 108 of the Fifth Annual Report.]

The Secretary presented a list of names of persons proposed as regular correspondents of the Board. The persons named were approved.

A communication from Milton Chase, M. D., of Otsego, relative to feeding hogs on offal from slaughter-houses, was referred back to its author with a request that he present additional facts or statistics.

The Secretary presented a Bill prepared by Dr. Folsom, of the Massachusetts Board of Health, designed to prevent the pollution of streams by sewers, slaughter-houses, manufactories, etc. The subject was referred to Dr. Lyster with a request that he report thereon.

The Secretary stated that diphtheria had been more than usually prevalent in this and other states, and suggested the issuing of a circular of information on the subject of its restriction and prevention. On motion, Dr. Hitchcock was requested to prepare such a circular. [See pages 86–89 of this Report.]

The Secretary presented a communication from the board of health of Minden township, Sanilac county, relative to the prosecution of members of that board for ordering killed and buried a horse diseased with glanders. Correspondence had been held referring the board to the prosecuting attorney for advice.

The Secretary presented a communication from A. Kehl, of Pulaski, asking how to secure drainage where it was essential that two townships should coöperate. The communication, together with the subject of amendments to drainage laws, was referred to Dr. Lyster and Hon. LeRoy Parker, Committees on Drainage and on Legislation.

A communication from Wm. F. Jenison of Eagle, Clinton county, relative to drainage, was referred to Dr. Lyster.

On motion, the Secretary was authorized, at his discretion, to exchange duplicate copies of books in the library of the Board.

The Secretary was directed to have 6,000 copies of Dr. Kedzie's address on "Healthy Homes for Farmers" printed from the type when set for the Report of the State Board of Agriculture.

On motion, the Board adjourned.

REGULAR QUARTERLY MEETING, APRIL 9, 1878.

The Board met in the office of the Secretary of State, at Lansing, at 9:15 A. M., the following members being present: Prof. R. C. Kedzie,—President, Hon. LeRoy Parker, Rev. D. C. Jacokes, and Henry B. Baker.

The minutes of the last meeting were read and approved.

The President read his annual address entitled "The Work of the State Board of Health," which was ordered published in the Sixth Annual Report. [See pages 1–14.]

The President and Secretary were appointed a committee to consider the subject of text-books on hygiene, for use in schools.

Hon. LeRoy Parker and Dr. Baker were appointed a committee to prepare and secure amendments to the laws for the collection of vital statistics.

Dr. Kedzie was appointed a committee and requested to prepare a general circular on disinfection.

Considerable discussion was had on the subject of a sanitary survey of the State.

The Secretary read a communication from Dr. Hitchcock stating that at the last moment he had been detained from attending this meeting.

Drs. Baker and Kedzie, Hon. LeRoy Parker, and Rev. D. C. Jacokes were appointed a committee to consider the best means of inaugurating the sanitary conventions recommended in the President's address.

Hon. LeRoy Parker read a report relative to drainage of low lands lying in two townships, and also remarks on the same subject by Dr. Lyster, to whom with himself the communication from A. Kehl, of Pulaski, had been referred. They recommended that the law should be so amended as to provide for an appeal to the Circuit Court. Dr. Baker suggested that the law might be improved by providing that the local board of health should control the drainage so far as it related to the public health. On motion, Hon. LeRoy Parker was requested to consider the subject with a view to drafting a bill for a law which should embody the amendment recommended by the committee and also the one relative to the authority of local boards of health. The reports and communications were referred back to the committee.

The Secretary read a report prepared by Dr. Hitchcock on "Wood Pavements and Sidewalks," which was accepted for publication in the Sixth Annual Report. [See pages 39–46.]

At the afternoon session the same members were present as in the morning.

Hon. LeRoy Parker read a report including the draft of a bill for more uniform legal provisions in townships, cities, and villages, relative to notices to the board of health of cases of diseases dangerous to the public health. The report was accepted and Mr. Parker was requested to endeavor to secure the passage of a similar bill.

A report by Dr. Hitchcock relative to "Tomatoes as a Cause of Cancer" was read by the Secretary. It was accepted for publication in the Sixth Annual Report. [See pages 33–38.]

Dr. Kedzie reported the examination of water from Climax. Many persons who drank of this water became sick with a peculiar fever which ran about fifteen days. He found the water full of water-fleas, and heavily charged with chlorides and with a large amount of albuminoid ammonia. He would report further at some future time.

The Secretary read an abstract of a letter from a physician in Vermont, giving an account of an outbreak of disease, similar to that mentioned in the preceding paragraph, and which was also traced to the use of bad water.

On motion, the committee on Vital Statistics, consisting of Drs. Hitchcock and Baker, was discharged.

The committee on revision of "Rules and Regulations" for local boards of health was continued.

The Secretary stated that Dr. Hitchcock had prepared the document on restriction and prevention of diphtheria, in accordance with the vote of the Board at its last meeting. [See pages lix, 86–89.]

The Secretary read a report of work in the office during the last quarter.

The Secretary was directed to publish the replies by correspondents to Circular 24, relative to Diseases in the State in 1877. [See pages 105–165 of this Report.]

It was voted that, in the Annual Reports, there be published reports of diseases and of meteorological conditions for the calendar year preceding the fiscal year for which the Annual Report is made.

The Secretary read a communication from Dr. Wm. Worsfold, of Jackson, relative to danger to life from the construction of railroad "frogs" and "guard-rails." The communication was referred to the Secretary who was directed to edit and publish it in the Annual Report. [See pages 459–464 of the Fifth Annual Report.]

The Secretary read a communication from Dr. J. H. Beech, of Coldwater.

relative to the filthy condition of railroad privies, and accompanied by a letter from the superintendent of the Lake Shore and Michigan Southern Railroad. The subject was discussed and referred to Dr. Kedzie.

The Secretary presented a communication from Dr. Milton Chase, of Otsego, relative to opium-eating, which was referred to Dr. O. Marshall, of North Lansing, who was writing a report on the subject.

The Secretary read a proposed bill embodying a proposed new section of law relative to vaccination, and authorizing townships, cities, and villages to offer free vaccination, to their citizens. It was referred to the committee on Legislation, with a request to bring it to the attention of the Legislature at its next session.

On motion, Dr. Kedzie was asked to attend the meeting of the American Social Science Association, at Cincinnati, Ohio, in May, 1878. [See pages 47-52 of this Report.]

On motion, Dr. Baker was asked to attend the next meeting of the American Public Health Association.

On motion, the resident members of the Board were asked to attend the next meeting of the State Medical Society, in Lansing. [See pages 53–59.]

The Secretary read the names of persons proposed as regular correspondents of the Board. The persons named were approved.

Bills were audited—vouchers 337–355 inclusive.

The Secretary was authorized to expend not to exceed fifty dollars during the year for books and publications for the library.

On motion, the Board adjourned.

REGULAR QUARTERLY MEETING, JULY 9, 1878.

The Board met in the office of the Secretary of State, at Lansing, at 9 A. M., the following members being present: R. C. Kedzie, M. D., President; H. O. Hitchcock, M. D.; Hon. LeRoy Parker; Rev. D. C. Jacokes; and Henry B. Baker.

The minutes of the last meeting were read and approved. During the reading of the minutes, Henry F. Lyster, M. D., came in and took his seat as a member of the Board.

Dr. Kedzie read a report on "Lead Poisoning from the Use of Tinned, Glazed, and Enameled Ware," which was accepted for publication in the Annual Report. [See pages 25–31 of this Report.]

Dr. Hitchcock presented a report of proceedings of the American Medical Association, at Buffalo, June 4–7, 1878, which was accepted for publication in the Annual Report. [See pages 15–23 of this Report.]

Dr. Baker was instructed to prepare a report of public health subjects in the proceedings of the State Medical Society, at Lansing, in May, 1878. [See pages 53–59 of this Report.]

Dr. Kedzie presented a report of "Public Health Subjects at the Meeting of the American Social Science Association at Cincinnati," in May, 1878, which was accepted for publication in the Annual Report. [See pages 47–52 of this Report.] In the discussion of this report, Dr. Kedzie mentioned an instance of the spread of cholera, at Southampton, England, by sewage which fell eight feet through the air; Dr. Lyster mentioned a case of typhoid fever in Detroit, apparently caused by inhalation of foul air from the soil-pipe of a privy used by a person who had malarial fever, but in whom was found no evidence of typhoid fever; Dr. Baker mentioned the spread of cholera in Kentucky by means of a privy used by a person who had the disease, every person who used the privy thereafter, until it was disinfected, coming down with the disease; he also mentioned a similar case as having occurred near Wheeling, West Virginia.

Drs. Kedzie and Baker, committee on text-books on hygiene for use in schools, reported that they had seen no suitable book. Discussion was had as to the preparation of such a book by members of the Board.

The Secretary was directed to publish in each Annual Report an abstract report of work in the office during the year.

On motion, it was voted that documents submitted to members for approval, in the interval between meetings of the Board, may be printed by unanimous consent, but that if one member objects, the printing must wait till next meeting of the Board.

On motion, the Secretary was authorized to use in that part of the Annual Report which is over his name, and which is usually paged in Roman numerals, any material that may have been referred to committees and returned by them, or that is not wanted for use by them.

At the afternoon session, the same members were present as in the morning; viz., Dr. R. C. Kedzie, President, Dr. H. O. Hitchcock, Dr. H. F. Lyster, Hon. LeRoy Parker, Rev. D. C. Jacokes, and Henry B. Baker.

The Secretary read a report of work in the office during the last quarter, which was accepted and placed on file.

The Secretary read a letter from Dr. Azel Ames, Jr., of Massachusetts, acknowledging the receipt of a copy of "Shadows from the Walls of Death."

Dr. Lyster read a report of a course of lectures on public health subjects which he had given to the medical class at the State University. It was accepted for publication in the Sixth Annual Report. [See pages 99–103.]

Dr. Hitchcock offered the following resolutions, which were adopted:

"*Resolved*, That this Board respectfully request the Board of Regents of the University of Michigan, and the Trustees of the Detroit Medical College, to establish in their respective institutions, at the earliest practicable moment, full chairs of Public Hygiene, and to fill the same with thoroughly competent professors.

"*Resolved*, That this Board respectfully requests the controlling Boards of all Collegiate Institutions and of all High Schools in the State to see that a course of instruction in Public Hygiene is given in each of their several institutions."

The Secretary was directed to transmit a copy of these resolutions to the Board of Regents of the University and to the Detroit Medical College.

The Secretary presented resolutions passed by the State Medical Society at its meeting in May, calling the attention of this Board to the danger from allowing insane people to be at large. They were referred to Dr. Hitchcock. [For a copy of the resolutions, see page 56 of this Report.]

The Secretary presented a communication from George Chapman, M. D., of Hudson, Lenawee county, relative to cases of sickness and death apparently due to use of bad water, which he was directed to edit and publish. [See pages lx–lxi of this Report.]

A communication was presented by the Secretary from John R. Curley, clerk of the township of Michigamme, giving an account of an outbreak of scarlet fever, and of vigorous efforts for its restriction. The Secretary was authorized to publish it in the Annual Report. [See pages lxii–lxiii of this Report.]

The Secretary presented a communication from Dr. Voorhees, of South

Bend, Indiana, giving an account of the fatal burning of a young lady by the breaking of a lamp containing the light oil known as "Rose Burning Fluid." It was placed in his hands for publication in the Annual Report. [See pages lxiv–lxv of this Report.]

The President presented a copy of the new Ohio law for the inspection of illuminating oils, which provides for a better inspection and a higher test than heretofore. The Secretary was directed to mention this law in connection with the material to be published on illuminating oils. [See pages lxv–lxvi of this Report.]

The Secretary presented a communication from John Weller, deputy inspector of illuminating oils at East Saginaw, concerning the bursting of a lamp from a defective wick-tube. [See page lxvii of this Report.]

Dr. Kedzie mentioned the breaking of a lamp by a heavy piece of a broken lamp-chimney falling on it.

The Secretary presented a communication from Perry Averill, State Inspector of Illuminating Oils, relative to the fatal burning of a Mrs. Phœbe Hoag, in Bedford township, Monroe county, by the explosion of a kerosene lamp. [See page lxv of this Report.]

The Secretary presented a communication from Rev. Charles H. Brigham, announcing his resignation as a member of the Board.

The Secretary presented a letter from Dr. J. H. Beech, of Coldwater, asking the Board to hold one of the proposed sanitary conventions at that place.

Rev. D. C. Jacokes gave an invitation to hold such a convention at Pontiac.

Dr. Lyster gave an invitation to hold such a convention at Detroit.

A discussion was held of details of the convention.

On motion, the Secretary was directed to make all necessary arrangements for holding a sanitary convention at Coldwater, during the winter of 1878–9.

The President was directed to call a special meeting of the Board at Coldwater, at such time as the convention should occur there.

The Secretary read the names of persons proposed as regular correspondents of the Board. The persons named were approved.

On motion, Mr. C. M. Welch, superintendent of construction of the Eastern Asylum for the Insane, at Pontiac, was respectfully invited to prepare for this Board a description of the sanitary appliances and arrangements at that asylum.

Bills were audited—vouchers 356–371 inclusive.

Drs. Hitchcock and Lyster presented the following resolutions relative to the resignation of Rev. C. H. Brigham, as a member of the Board:

"The undersigned, having been associated with the Rev. Charles H. Brigham since the organization of the Board, desire to call attention of the Board to the fact of his resignation on account of continued illness, and to express our personal sympathy with him in the severe trial which has separated him from the grand work of public health; wherefore,

"*Resolved*, That the broad views and liberal education of Rev. Charles H. Brigham rendered him eminently fit to elucidate truth and instruct the people in public hygiene; and that in his resignation we lose the services of an able coadjutor.

H. O. HITCHCOCK,
HENRY F. LYSTER."

The resolution was adopted and the Secretary was directed to transmit a to Rev. Mr. Brigham.

On motion, it was ordered that 20,000 copies of the document on the restriction of diphtheria, prepared by Dr. Hitchcock, be printed. [Reprinted on pages 86–89 of this Report. The document has been stereotyped, so that local boards of health can secure copies for distribution without the expense for setting the type. W. S. George & Co., Lansing, Michigan, will supply copies as follows: One hundred, for $1.75; two hundred, for $2.50; three hundred, for $3.50; four hundred, for $4.25; five hundred, for $4.75; and one thousand, for $8.00.]

On motion, the Board adjourned.

SPECIAL REPORTS AND COMMUNICATIONS TO THIS BOARD.

During the year, communications have been received from health officers, from regular correspondents, and from others, containing valuable statements of facts and important considerations, bearing upon different subjects connected with public health. Some of them have been referred to the different committees of the Board, and appear in other parts of this volume; some have been referred to the Secretary, with authority to publish; while time has not been found, during the limited sessions of the Board, to present, at length, all communications of this class that have been received. A report of the work of the Board would not be complete without some mention of these communications, and a few of those not otherwise disposed of are believed to be of such value as to make it desirable that they be included herewith. Those selected for publication are the following:

CASES OF TYPHOID FEVER ATTRIBUTED TO EMANATIONS FROM AN IMPERFECT DRAIN,—REPORT MADE BY JAMES HUESTON, M. D., TO DR. J. M. SWIFT, HEALTH OFFICER OF NORTHVILLE, AND BY HIM TRANSMITTED TO THIS BOARD.

Dear Doctor:—In compliance with the law for reporting cases endangering public health, I might report some cases of diphtheria, scarlet fever, and typhoid fever, but none under unusual circumstances, or in which my report would differ from hundreds of others, excepting the cases of typhoid fever occurring in one family where the local causes were or seem to be poison emanating from an imperfect drain.

Eight feet from a new house a hole was dug and filled with small stones; a ditch, also filled with small stones, inclosing a five-inch tile not below freezing depth, led from this to the house. This communicated to the kitchen by means of an open box leading through the floor, and thence through the side wall.

Last winter the contents of this drain were entirely frozen, and slops of all kinds were thrown in, filling the parts above stone, tile, and all. In the spring when the frost was out, it did not clear itself; and on the whole being removed, the tile and spaces were found filled with filth and rich with fever-producing poison,—but discovered too late, as it had nearly cost the life of every member of the household: First, Rev. G. A., wife, and son; next, Prof. K., a music teacher; then a strong woman who was placed in the kitchen to do housework; and after her a more delicate woman who took her place,—each in turn falling victims, all having marked symptoms of typhoid fever of a very low type. None of them entirely recovered until they left the house. These, and similar cases, seem to teach that a law compelling every builder to call a competent health officer to decide how the drains, cesspools, etc., should be located would be as rational as to report after the victims are slain.

Northville, Jan. 24, 1878. JAMES HUESTON.

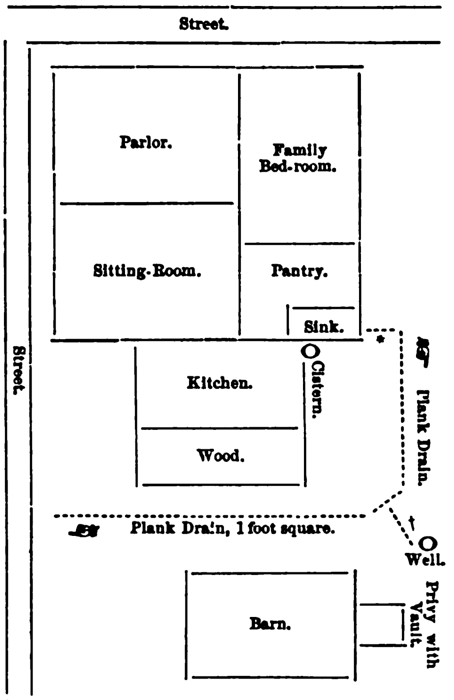
CASES OF SICKNESS AND DEATH ATTRIBUTED TO USE OF WATER CONTAMINATED BY LEAKAGE FROM A SLOPDRAIN, REPORTED BY GEORGE CHAPMAN, M. D., HUDSON, MICH.

Secretary State Board of Health:

SIR:—Enclosed find a hastily written history of facts respecting cases of paludal or malarial poison. It adds another example to the records of carelessness and ignorance. Our people are waking up to the subject; they are clearing out the gutters and waste places, and otherwise trying to avoid sickness.

January 1, 1876, at 3 o'clock P. M., I was called to see F. B. I learned from himself that he had been taken the day previous, about dark, with a severe chill; had had chills and fever, with profuse sweating, all night; had taken six Cheeseman's pills and 10 grains sulphate of quinine. The pills had "operated most too much." I found him in a bad condition,—pulse full and bounding at 80; extremities cool; head hot and feeling as though it would burst; face flushed; eyes bloodshot; tongue covered with white fur, and dry; he had a feeling of tightness in the chest. I diagnosed paludal poison, and treated accordingly; but all to no purpose. He died on the 4th day. Mr. B. was a merchant, apparently a stout, healthy man; his height was 5⅔ ft.; weight, 180 lbs.; age, 35 years. He was very temperate and moral; always at home or at store; ate regularly and heartily; was early to bed and early to rise; bathed often. He drank cold water only, of which "his well furnished the best and most of any in town." I inclose a rough sketch of the premises.

Outline of premises of F. B. B., Hudson, Mich.



* Waste water, etc., from the sink.
† Drain for waste water from well.

Mrs. B., a stout woman aged 33 years, was sick with the same fever, in milder form, at the time I was called; but was soon convalescent. The shock produced by the death of her husband induced brain fever, and she died in 4 days.

Of the children, one young lady, aged 17 years, had been puny and sick with "liver complaint" nearly a year; two others, aged 9 and 5, were sick most of the time with ague and "bilious colic." But on removal from the premises, all recovered and are now healthy and strong.

The September previous B. brought a fine parrot from Chicago. It was taken sick; had chills and all the symptoms of malarial fever. A canary bird, also, was taken sick with the same fever; but on removal to a neighbor's, both recovered and were happy.

Mrs. B. was a pattern of neatness and boasted sanitary hygiene. She bathed often, aired the house well, had thermometers around to keep the temperature even day and night, always had windows dropped from the top, especially the one in the family bed-room.

The drain, shown in the diagram, was built two years previously to the fatal sickness; but the summer previous, Mr. B. had noticed that the slops and waste-water, which were all poured out of the sink, were not running off but were soaking into the ground, a gravelly soil, the drain being filled up; and he was going to fix it in the spring.

The family were broken up; and another family wishing to move in, I told them they must not till a thorough examination was made of well, drains, etc. On attempting to pump the water out of the well, which was 10 feet deep in a 30-foot well, they soon found out that they were making no headway. They took up the drain leading from the well to the street, and so great was the stench that the men were all sick. A current was found leading down from the drain directly into the well, at a considerable depth from the surface. Under the woodhouse and kitchen *beautiful* mold and dampness covered the ground and walls like frost. We had the whole premises renovated, and there has been no sickness of that sort in or around the neighborhood since.

Yours respectfully,
Hudson, Lenawee Co., April 11, 1878. GEORGE CHAPMAN.

October 19, 1877, the board of health of Homer township, Calhoun county,—A. M. Allen, Health Officer,—reported an instance of apparent communication of typhoid fever by the person of one sick with it, as follows:

"John Windover, aged 23, died of typhoid fever, October 19, 1877. The source of contagion was bad water. He was removed to his father's residence, and three more of his father's family were taken sick with the same disease and recovered after a long spell of sickness."

August 16, 1877, Dr. John Tatman, Health Officer of Muskegon, wrote:

"Our healthfulness the last few years we attribute to the water in the lake and river keeping up high through the season. If the weather continues dry through this month and September, we will have a great amount of malarious diseases, as the lake is one foot lower now than for the last few years."

November 5, 1877, Dr. Tatman wrote:

"We have had very little sickness here the last few years, in comparison with former years; we have had no epidemics, or contagious diseases, this summer; we have had a few mild cases, perhaps one hundred all told, of malarious fevers, intermittent, that were easily subdued by treatment."

OUTBREAK OF SMALL-POX IN LE ROY, INGHAM COUNTY; REPORTED BY R. B. SMITH, M. D., HEALTH OFFICER.

Secretary of the State Board of Health:

DEAR SIR:—Below you will please find report of seven cases of variola in this vicinity during the month of June.

The first case was that of Chauncy Beckwith, aged 18 years. He had been at work on a gravel train, a couple of weeks, at Portland, Mich. He came home June 1, and was taken sick immediately.

As soon as we ascertained that we had small-pox to contend with we vaccinated the rest of the family, but too late to prevent their contracting the disease; I also at once notified the township clerk, who called a meeting of the board of health to to take some action in regard to the matter. A house about three-fourths of a mile from the village was procured, which was converted into a pest-house, where we removed the patients as fast as they were taken sick, and also the clothing and furniture belonging to them. Notices were posted on both houses, and at some distance from them, and all persons not needed for nurses were forbidden to enter into or go near either house. Before we were aware of the nature of the disease, there were a number of exposures to the contagion, and they were also notified to remain on their own premises for the period of twenty days. There has been no case of the disease, however, outside of the family where it first broke out; and we hope that by using care in renovating and disinfecting the house and contents, and by keeping the persons who have had the disease at a proper distance, for a couple of weeks yet, to prevent any further spread of the disease in this vicinity. Any information that you may be able to give us in regard to thorough disinfection will be thankfully received.

Yours, very respectfully,

Le Roy, Ingham Co., June 10, 1878. R. B. SMITH, M. D.,
Health Officer.

June 6, 1878, William Simonds, M. D., Health Officer of Warren township, Macomb county, reported details of 23 cases of small-pox, occurring from February 1 to May 14, 1877. In some of the cases the disease was derived from clothing from the city; in some, from the paper-mill. Of the 23 cases, 7 died.

OUTBREAKS OF SCARLET FEVER.

November 12, 1877, Dr. Wm. P. Maiden, of Alpena, wrote, concerning an outbreak of scarlet fever:

"The house was well disinfected with sulphurous acid, and was daily ventilated. Every precaution was used by myself and the family to prevent the spread of the disease, and I trust we have succeeded."

In December, 1877, L. D. Knowles, M. D., Health Officer of Pine Grove township, Van Buren county, reported details of 14 cases of scarlet fever, occurring from July 23 to September 27, 1877. The disease was introduced by some one who had been visiting in the eastern part of the State.

AN OUTBREAK OF SCARLET FEVER IN MICHIGAMME TOWNSHIP, MARQUETTE COUNTY, AND STATEMENT OF MEASURES TAKEN BY THE LOCAL BOARD OF HEALTH FOR THE RESTRICTION OF THE DISEASE, REPORTED BY JOHN R. CURLEY, CLERK.

Secretary State Board of Health:

DEAR SIR:—I herewith report to you the occurrence of scarlet fever in this township, and the methods we have taken to check the spread of the disease. The first case reported to me was the child James Hayes, aged about five years. It was reported on the 10th day of June, by Dr. Jos. Vandeventer, health officer of the township, as a mild case of scarlet fever. On the 12th, another case was reported, the child of Richard Hackett. I asked the doctor to examine the locality and report if any thing could be done by the board. He did so, and reported that the locality was good in regard to sanitary condition, and that the children reported above were convalescing. So the matter stood until the morning of the 18th, when another case was reported, that of Ann Dolan, 10 years old, who died this morning. To-day two more cases are reported; one in the family of Cornelius Shea, and one in the family of John Shea. On hearing of these new cases, I immediately called our board of health in session to devise some means to stop the spread of the disease. We have had notices printed, of which I send you a copy, besides posting notices of the disease over the doors of the affected buildings. We have also caused all dogs to be tied up, under penalty of being shot. We have also closed our schools. It seems to me that the disease is now at its height. If there is any suggestion you can give us in regard to the restriction of the disease, it will be thankfully received and acted upon.

Respectfully yours,

Michigamme, Marquette Co., June 20, 1878. JOHN R. CURLEY,
Clerk of Board of Health.

Copies of the document issued by this Board on the Restriction and Prevention of Scarlet Fever (pages xxix–xxxii of the Fifth Annual Report) and of Circulars 25 and 28 (pages xxiii.–xxxiii. of this Report), and also a caution as to the dissemination of the disease by clothing of patients after their recovery, were immediately sent to Mr. Curley.

June 25, 1878, Mr. Curley wrote:—

"DEAR SIR:—Yours of the 22d is at hand; thanks for promptness. The scarlet fever epidemic has not abated yet, but we have managed to confine it to one locality. A death took place Saturday, June 22, a child of John Harrington, aged 10 years, sick three days. As I am now writing this, the health officer, Dr. Vandeventer, just informs me that another death has taken place in the same family, a girl aged 9 years. We have taken steps this evening to rent a house in an isolated part of the village, and remove the remainder of the family into it. The citizens have given by private subscription enough to procure changes of clothes for the entire family, which consists yet of 9 persons. We have given orders to have all the bedding and clothes of the infected house burned, and we also prohibit children from going within a radius of 300 feet of the infected locality. The other cases mentioned in my last letter are convalescing and in a fair way to recover.

"I shall keep you fully posted as to our movements. We are so fortunate as to have for our health officer an efficient and skillful physician, Dr. Jos. Vandeventer, to whose untiring energy we are greatly indebted. I should like to be informed whether in a case like ours it does not become a county charge for the expense incurred, as we have no fund in our township that applies to that purpose. Please give us your advice on this subject. We are determined to root out the disease, though, no matter who pays for it.

Respectfully yours,

Michigamme, June 25, 1878. JOHN R. CURLEY,
Clerk of Board of Health."

In reply to the above inquiry, a copy of the compilation of Public Health Laws and a copy of the compilation of Laws Relating to the Support of Poor Persons were obtained from the State Department and sent.

June 29, 1878, Mr. Curley wrote: "I am happy to inform you that the scarlet fever has abated, as there is no new case."

PERIOD OF INCUBATION IN DIPHTHERIA.

Referring to the outbreak of diphtheria in Clarkston, reported by him (pages 81–83), Dr. J. S. Caulkins of Thornville, wrote, Oct. 6, 1878:

"Notice the strong probability that in Keillor's case (mentioned on page 83), the incubatory stage was but 24 hours. There are several good physicians at Oxford, and at Orion, three miles south, careful inquiry among whom shows no other even remotely probable source of the infection. The inference is irresistible that he caught the disease at Bailey's."

ILLUMINATING OILS.

Although a State may not be able to fix the prices of the different articles employed for illuminating purposes, this State has recently been able to protect, almost completely, the lives of its citizens from that horrible danger which persons, and particularly the women and children, in some other States, are still permitted to suffer,—namely, the constant danger of being roasted to death in one's own home, because of the use of illuminating oil advertised as safe, but which is really more dangerous to have about than is gunpowder.

That there is a real danger against which the supporters of the present useful tests for illuminating oil are contending, evidence is continually coming to light. As showing something of this danger, and as showing the necessity for that constant vigilance by which alone an efficient inspection can be maintained, the following communications are here printed:—

BREAKING OF A KEROSENE LAMP AND FATAL BURNING OF A YOUNG LADY THEREBY, AT SOUTH BEND, INDIANA; REPORTED BY G. V. VOORHEES, M. D.

Secretary State Board of Health, Lansing, Mich.:

DOCTOR:—* * * In regard to the burning of the young lady with kerosene oil in this city, I cheerfully give you all the information possible.

At a quarter before nine o'clock, on the night of the 6th inst., Miss Mary Wheeler, aged 17 years, a beautiful and promising girl and only daughter of A. H. Wheeler, formerly a merchant here, while ascending the stairs, carrying a large glass lamp filled with Rose burning-fluid, caught her foot in her dress and fell, dropping the lamp, breaking it in many pieces. Immediately the oil became ignited, she falling into the flame, which ascended many feet completely enveloping the upper part of her person. Mrs. Wheeler was accompanying her daughter to the chambers, preceding her and enjoining her to be careful of the lamp. She had reached the head of the stairs when she heard the crash, and looking around saw her daughter enveloped in the flames at the foot of the stairs. The mass of flame was so great that it formed an impenetrable wall reaching to the ceiling of the second floor. Being so shut off, the mother could render her daughter no assistance. With a wonderful presence of mind, Miss Wheeler immediately filled her mouth with a shawl she found near by, and made her way to the sitting-room below; from there she rushed into the kitchen, and emptied over herself two pails of water, with no effect save to subdue the flames somewhat. By this time the unusual light brought to her assistance a neighbor, who broke the door open, and taking off his coat threw it around her. Miss Wheeler directed him to get a quilt from an adjoining room, which he procured and wrapped about her, extinguishing the flames.

Her injuries consist of the following burns: The front of the body was burned from the waist to the throat, extending over the chin—quite deep; the left arm was badly burned from the fingers to the shoulder, so that at the present time the elbow joint is denuded of soft tissue; the left ear was badly burned; the right arm was burned from the fingers to the elbow joint; the face was slightly burned.

You can judge of the intensity of the heat when you know that her gold necklace, breastpin, and ear-ring were melted, and nearly all of her clothing excepting her corset was burned away.

The fire in the stairway was extinguished without doing much damage.

The young lady will probably die, being very much prostrated and unable to retain nourishment or stimulants.*

Notwithstanding this accident, and previous ones of similar character that have occurred in this section, within the last few years, hundreds of families in this city are to-night, using this same fluid to light themselves to bed; merchants continue to sell it, and we have no law to prevent. Those who sell it also represent it as non-explosive, and perfectly safe.

You fortunately have a law prohibiting the sale of the "Rose" in your State; but, unfortunately, it does not prevent your citizens from coming into Indiana and filling their ten-gallon cans and taking it home for illuminating purposes. That they do ais I know, having been informed this evening by a gentleman that a relative of is, living just over the line in Michigan, is in the habit of buying Rose fluid in this ty for burning in Michigan. It may be of advantage to the Inspector of your tate to know these facts, and thereby take some means to protect your citizens gainst themselves and those who sell it here and at other points along the line. t may also thus be of advantage to you, as well as us, to suggest a plan of proedure whereby we may establish legislation similar to that of the State of Michian. Our State Medical Society is taking steps toward the organization of a State oard of Health, and it may be we may thus reach the desideratum.

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* [At a later date, Dr. Voorhees wrote: "Miss Wheeler, the victim of the *homicide*, died on the 5th of June." It will be seen that she lingered, in agony, nearly one month.—H. B. B., Sec.]

I am respectfully yours,
G. V. VOORHEES.

South Bend, Ind., May 27, 1878.

The exceptions to the complete protection of life in Michigan from the terrile death by burning kerosene are belived to be very few, and to occur near ae borders of other states. In the foregoing letter, Dr. Voorhees shows how ifficult it is to secure complete inspection in one state while a neighboring state as no such system of protection to life. The following letter relates a case here a death in this State apparently resulted from the use of illuminating oil, hough the oil which caused the death was said to have been the Ohio oil.

URNING OF A WOMAN IN BEDFORD TOWNSHIP, MONROE COUNTY, MICHIGAN, REPORTED BY PERRY AVERILL, STATE INSPECTOR OF ILLUMINATING OILS.

ecretary State Board of Health:

DEAR SIR:— * * * Mrs. Phœbe Hoag, an old lady of 80 years, living in Bedford ownship, Monroe county, near Toledo, was burned to death February 3. She lived lone. Her home was discovered to be on fire about 7 o'clock P. M., by a passing eighbor, who gave the alarm, and with the assistance of a few neighbors immeditely broke open the house and extinguished the fire which was confined to one oom. A broken kerosene lamp indicated the cause of the fire. Her body was found n an adjoining room, life being extinct. Her clothing was burned entirely off. The il used is said to be Ohio oil.

Very respectfully,
PERRY AVERILL,
State Inspector.

Jackson, Mich., March 2, 1878.

There is reason to hope that even the comparatively few deaths which now ccur in this State may be still further reduced, through the indirect effects of ork done in this State for the prevention of deaths from this cause. When his Board began its work, Ohio inspection of oil was simply by the old uncerain "commercial test;" the so-called "State Inspector" was an employee of he Standard Oil Company, and the oil used in that State was just what it leased the oil companies to furnish; but on May 15, 1878, the General Assemly of Ohio passed an act providing for the appointment of a State Inspector nd deputy inspectors of mineral oils; and regulating the sale of the same for luminating purposes. This act provides much better inspection and a higher est than they previously had in that State. According to newspaper and other ccounts received from Ohio, the law seems to have been passed as a result f the action on the subject in this State, more especially because of the eview of Ohio inspection showing its entire uselessness, and because of other ork on the same subject by Dr. Kedzie, published in the First Annual Report of his Board, and of the subsequent work on the subject in this State, in conection with the almost entire immunity from loss of life from "kerosene horrors" in this State, since the late laws for the inspection of illuminating oils have been in force.

In an article entitled "The Defects in the Old Oil Law," the Cleveland Leader of May 21, 1878, after referring to different reasons alleged as having led to the amendment of the law said:

> "It is certain that some such law was imperatively demanded. We have before us a report of the Secretary of the Board of Health of Michigan, a part of which is a paper by Prof. Kedzie, upon the danger to life from the use of oils*; and a great part of it is a vehement protest against the Ohio law and the practices it tolerated. Professor Kedzie quotes the law in full, to show that under it the manufacturer of oil is practically his own inspector, and pronounces upon its fitness for use. He may either do so himself or cause it to be done. The practice, Professor Kedzie says, has been to hire an inspector, who brands the barrels and signs his name as inspector, but he has no official character, has taken no oath of office, is appointed only by his employer, is not liable to any penalty for fraudulent inspection or branding, or in damages to any person who may sustain injury in consequence of his fraudulent or careless inspecting or branding, may be pecuniarily interested in the sale of the oil he inspects, and has no risk to incur except loss of favor from his employer. The manufacturer and vendor are alone responsible, and they only amenable when they sell oil below the inspection of 110 degrees Fahrenheit.
>
> "The consequences of this condition of the law were shown by a lengthy table of the results of the re-inspection of Ohio oil in Michigan. Oil branded as 'warranted above 150 degrees fire-test flashed as low as 90 degrees, and took fire at 100 degrees.' This was an extreme case, but the whole list showed that oils warranted as standing fire tests of 150 and 175 degrees generally flashed at from thirty to forty degrees below the warranty, and took fire at eight to fifteen degrees above the temperature of flashing. It is possible, of course, that these oils may have been adulterated by mixing after leaving the hands of the manufacturers, but the results of the investigation were so startling that no more Ohio oil could be sold in Michigan without undergoing a new inspection. This saved the people of that State from many a disaster, to which the citizens of Ohio have continued to be exposed.
>
> "No law will keep people from burning themselves to death with coal oil, who use it to kindle fires, and in other reckless ways, but the new inspection law appears well calculated to afford all the protection necessary for those who use the article judiciously and carefully."

The new law in Ohio for the inspection and regulation of the sale of illuminating oils, though not as effective for good as is the law in Michigan, is much better than previous laws, and there is reason to hope that the efforts being made by philanthropic persons in other neighboring States may result in the gradual improvement of their laws on this subject, and that citizens of Michigan living near the borders of those States will thus gain in greater security to life.

It is not claimed that oil that will stand the tests required by the law in this State, is safe under all circumstances; but only that it is comparatively safe under ordinary circumstances and proper care. The following is a report of the occurrence of a lamp explosion, where the oil used was properly inspected and branded, but the lamp was defective. In this case, fortunately, there was no loss of life.

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* [Printed on pages 34-59 of the First Annual Report of this Board.]

EXPLOSION OF A KEROSENE LAMP, SETTING FIRE TO ARTICLES IN THE ROOM, AT EAST SAGINAW, MICH.; REPORTED BY DEPUTY INSPECTOR JOHN WELLER TO THE STATE INSPECTOR OF ILLUMINATING OILS, PERRY AVERILL, WHO TRANSMITTED THE REPORT TO THIS BOARD.

Perry Averill, Jackson, Mich.:

DEAR SIR:—Yours of February 28 is at hand. In reply I would say that I have learned all the facts that can be got about the lamp explosion in the house of James Covert. They are as follows: The lamp was a large hand-lamp with an old-fashioned burner which had been in use about four years. The tube of the burner is flat and about one-half an inch long, and is spread in the center to about twice the width it ought to be; it was used with a bell-top chimney. The lamp was filled, but not trimmed, at dark; and when the family retired it was turned down and allowed to burn low. At about 12 o'clock, Mr. Covert was obliged to go out in a great hurry; he picked up the lamp in a hurry, went to the kitchen, set the lamp on a table near the door, opened the door with a strong wind blowing in, went out, shut the door quick, and had got about 10 feet when he heard the explosion. He went back and found the lamp broken, the oil scattered around over a basket of clothes and a box of kindlingwood, and all on fire. He says the lamp has not acted well for over a year. It would often catch around the burner, and on carrying it up stairs or lifting it quick it was apt to catch. He does not think it was the fault of the oil, and went the next day and bought more of the same oil at the same store. It was the standard bulk oil used, properly inspected and branded. I have but one theory in the matter myself, and that is that the tube having been pried open so wide allowed the blaze to run down the wick or go through two small holes that I found close to the side of the tube. These facts I got from Mr. Covert himself, when he and I found the burner and examined it.

Yours respectfully,
JOHN WELLER,
Deputy Inspector.

East Saginaw, Mich., March 1, 1878.

THE IMPORTANCE OF INSPECTION OF ILLUMINATING OIL.

The question to be decided by an inspection of illuminating oil is likely to be, in any case, a question of life or death to the consumer of the oil; while in most other official inspections the question is more frequently only a matter of dollars and cents.

The inspection of neither timber, salt, meat, nor flour, is of such importance to the people as is this inspection of illuminating oil; because concerning the first-mentioned articles most people can, of themselves, learn something of their quality; but there are very few people who, even if they have the required apparatus, can of themselves learn the quality of the illuminating oil they purchase, so far as relates to the safety or danger to life from its use. Aside from the State Inspector and his deputies, there are probably few people in the State who, without instruction, can make an inspection and decide whether a sample of oil is or is not dangerous for use in an ordinary lamp.

In the qualities of ordinary kerosene oil there are at least two sources of danger; one of which cannot economically, expeditiously, or safely be tested for by ordinary persons, unskilled in the knowledge of the manner of the formation of explosive compounds by the mixing of air with the vapors of kerosene. Explosive compounds can be made with the vapor of any of the ordinary carbon oils, by mixing it in certain proportions with air. So far as relates to the "flash-test," the question to be decided by an inspection is whether under certain conditions the oil will contribute to an explosion. In this State the flash-test, now that it has been reduced to that of 140° F., is so low that the margin on the side of safety is very slight, and would probably not be uniformly secured through inspection by persons not familiar with the subject. Experiment has shown that a flash-test of even 150° F. does not necessarily give us safe oil if the absence of a test for paraffine permits that substance to remain in the oil, for the paraffine clogs the wick, and causes the wick-tube to become much heated.

THE PRINCIPAL CAUSES OF LAMP EXPLOSIONS.

It is believed that the real source of the danger from lamp explosions was not known at the time this Board began its labors on this subject. It was then believed that if the oil did not give off an explosive vapor at a temperature below that usually reached in the body of the oil in the lamp, the oil was usually safe. Now it is known that this is not true; because of the fact that a vapor, which may become explosive, is given off from the oil in the wick in contact with the heated wick-tube, if the oil used is of such low test that it gives off such vapor at a temperature to which such wick-tube is heated.*

In deciding as to the proper flash-test for illuminating oil, therefore, it is essential that the fact just mentioned, in the preceding paragraph, be constantly kept in mind; and one of the first questions to which we must have an answer is,—What is the temperature of the lower part of the wick-tube in ordinary lamps? It has been found that this depends very much upon certain circumstances, such as the freedom with which the oil burns, which depends somewhat upon the wick, and much upon the amount of paraffine in the oil; and the present law in this State very properly fixes the limit of adulteration by paraffine, so that we thus have one fixed point from which to start. There is not much evidence, but it is believed that with such oil as our law permits, the lower part of the wick-tube does not usually get hotter than about 140° F., so that, theoretically, oil that is as free from paraffine as is required by the law in Michigan, and that does not flash at a temperature below 140° F., is usually safe with good lamps and proper care; and the same conclusion is reached practically, because, during the past year and more, such has been the oil used in this State, and the few deaths and other such occurrences from the use of oil have been believed to have occurred from the use of oil purchased in other States, and not up to the Michigan standard, or from the use of lamps not entirely perfect.

There is, however, one source of danger which is not guarded against in the present law, and it may not be practicable to provide safety from it by law, though it should certainly be known and guarded against by all who use kerosene oil for illuminating purposes. This danger is of explosion because of the breaking of the lamp chimney, which causes the wick-tube to become very much heated, and the upper part of the chamber of the lamp to become filled with vapor of oil, which becomes explosive on mixing, in certain proportions, with ordinary air. It is now known that an ordinary lamp lighted and partly filled with oil that will stand the Michigan test, is, under ordinary circumstances, in a condition liable to an explosion, in about fifteen minutes after its chimney has been removed or broken so that it falls off. An account of some experiments which appear to demonstrate this fact, was published in the last Report, for 1877, pages lxxv.–lxxviii., though accounts of experiments which indicated the same fact had previously been published on pages xxx.–xxxi. of the Report for 1875, and pages xlviii.–xlix of the Report for 1876.

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*The experiments which demonstrated this are referred to on page 77 of the Report of this Board for 1877, and the experiments are described on pages lxxv.-lxxviii. of the same volume.

The subject of the danger to life from the use of low-grade or volatile illuminating oils, is only one of many subjects which have engaged the attention of members of this Board, but from the organization of the Board it has seemed to demand a considerable amount of labor on the part of members, and in the office of the Secretary, perhaps because of the former frequency of "kerosene horrors," which under the present law are rare, and which it is hoped may continue to be infrequent.

This Sixth Annual Report is respectfully submitted.

HENRY B. BAKER,
Secretary.

THE WORK OF THE STATE BOARD OF HEALTH:

THE ANNUAL ADDRESS FOR 1878,

By R. C. KEDZIE, M. D.,

PRESIDENT OF THE BOARD.

THE WORK OF THE STATE BOARD OF HEALTH.

The rules of the State Board of Health make it the duty of the president to deliver an address to the Board at the annual meeting in April each year. In the discharge of this duty it seems to me that it might be desirable to take a retrospect of the work performed by the Board, in order to consider what subjects in the immediate future demand the attention of the Board.

The State Board of Health has been in existence for five years. At the time of its organization a great variety of subjects commanded your immediate attention. As Adam and Eve, when they removed into a very new country, found

> The world was all before them where to choose
> Their place of rest;

So the Board found the largest liberty of choice of what to do, because everything was yet to be done. The nature and scope of the work of the Board had indeed been blocked out in the organic law; but the specialties of that work, and even the methods and instrumentalities for carrying them out had to be devised and set in motion.

The first effort of the Board was to reduce to system the work of the members of the Board, by appointing a number of standing committees on the general topics which would come before them for consideration. In this way each member was assigned to some field of inquiry and investigation most congenial to his habits and tastes; at the same time the field of state medicine was, to a certain extent, mapped out into distinct departments. This general plan of dividing up the work of the Board among a number of standing committees has been so successful in its working that every State Board of Health subsequently organized in this country has followed our example in this respect.

The second step of the Board was to organize the sanitary forces throughout the State by securing well organized and effective Boards of Health, wherever such Boards were not in existence, in all the cities, villages, and townships in our State, with an active health officer in each Board; and then to bring the State Board of Health into communication and active coöperation with all these local Boards of Health. Two prominent objects were to be secured by this means: (1.) To have an effective channel for imparting information to the people in a form which would most successfully reach the masses, by being placed in the hands of those who could appreciate and would use the information; (2.) To have organized bodies through which the statistics in regard to public health could be gathered from all parts of the State.

The third step of the Board was to enlist in the peculiar work of the Board all the physicians of the State and all other persons interested in sanitary matters. A corps of special correspondents was also secured in many prominent points in the State to gather more complete information on any subject relating to the public health.

The Board has sought to work through all these bodies and organizations for the advancement of the public health. Circulars giving information of great value, especially in regard to the prevention of disease, have been issued from time to time and sent to all local Boards of Health in the State, to local correspondents, and all others who seek to promote the public health; circulars asking for information on a variety of topics have been sent to the same Boards and persons.

These efforts both to impart information and to gather statistics bearing on the public health have met with gratifying success. Not only sanitarians but the people at large are grasping that very important and revolutionary idea, *the possibility of the prevention of sickness and death,* that many diseases may be prevented altogether, or that, when they do appear, they may as certainly be stamped out as a forest fire may be extinguished, or they may be walled in like an inundation. A people that fully grasps the idea that half of their sickness and half of their deaths may be prevented or avoided as truly and as really as they may prevent the destruction of their crops by cattle, by proper fencing, has taken a long stride in state medicine. The idea is germinal and will spring up in "trees of life whose leaves are for the healing of the nations;" for when men clearly see that they may honestly repudiate half the claims of sickness and death, they will soon learn to use the means for their own protection. That old cynic was right when he exclaimed "Skin for skin; yea, all a man hath will he give for his life." But the people need to clearly apprehend, and to fully comprehend one additional fact, that *each person is in the broadest and fullest sense healthy and safe only as every person about him is also healthy and safe.* The starved and neglected prisoner in jail or in workhouse, the despised or forgotten pauper in filthy hovel or wayside ditch, may vindicate their claim to our common humanity by making us heirs of all they possess, bequeathing to us the very diseases which destroyed them. Rowland Jenkes in the ill-kept and over-crowded Oxford jail, reeking with malignant typhus, when arraigned at the Oxford Assize, vindicated before that haughty court his claim to a common humanity by infecting judge and jury, lawyers, witnesses, and spectators with the dreadful fever contracted in their neglected and suffocating jail; for the whole court speedily died by this same fever, which spread through that city and the surrounding country till five hundred persons perished within six weeks with the fever imparted by this single prisoner. No wonder they called it "the black death," and that this court should go down in history as "the black assize of Oxford."

The lesson that society is an organic whole, and that "if one member suffers all the members suffer with it," the people are slow to learn. It was a murderer (and to conceal his murder) that first asked, "Am I my brother's keeper?" The spirit of that inquiry is in direct opposition to the cardinal principle of state medicine, that EACH MAN IS SAFELY KEPT ONLY AS HE SAFELY KEEPS HIS BROTHER. This is a simple lesson, but hard to learn, and still harder to remember. When it is well mastered and universally applied, the problems of state medicine will be greatly simplified.

The Board has also begun to gather reports of the prevailing diseases, for purposes of comparison and study. The reports required by law for the collection of vital statistics relate only to births, marriages, and deaths; and in regard to the latter, no return is required except "the disease or apparent cause of death," no account being taken of the remote causes of death, or of diseases which did not terminate fatally. It was a grand idea to pluck from the laurels of death a balm of healing, by thus comparing and studying the immediate causes of death. But if benefit is secured by investigation in so narrow a field, how much more would we be benefited by a study of the entire records of sickness of the people, the causes, concomitants, tendencies both immediate and remote,—the whole subject being studied both in regard to the causes of sickness and in relation to the prevention of the same. State medicine will never have reached its proper development till the social statistician, by means of returns which shall embrace all the diseases and known causes of such diseases, as well as the deaths and known causes of the same, shall be able clearly to point out how these remote causes have influenced and modified the immediate causes of death. This is a vast field, and it requires a broad grasp of mind to equate all the terms of so complex a problem.

The Board has also begun to gather data which shall exhibit the physical conditions, in this State, relating to health and disease,—the water-supply, the forest-growth, drainage, natural and artificial, temperature, rainfall, etc. A small but well distributed corps of meteorological observers give hope of valuable results in the near future. These physical conditions, which more or less directly influence the public health, are so wide-spread in their action, affecting the entire population of a district or even a State, as to demand careful consideration and investigation at your hands.

I have thus briefly passed in review some of the means by which the Board in its collective capacity has attempted to promote the public health and to discharge the obligations laid upon it when the law decreed that "The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of this State." No more solemn charge was ever laid upon a body of men by our legislators, and the Board has not been unmindful of what the State demands at its hands.

Of the labors of the individual members of the Board I need say little, for these speak for themselves. By laborious and pains-taking investigations into the causes of sickness, the conditions involving insecurity to life and health, and by pointing out the way in which health may be more certain and life more secure, you have toiled on, often without appreciation or thanks from the very persons most benefited; and the Reports of your Secretary, from year to year, bear witness to the faithfulness and thoroughness of your work. I do not recall these things in any spirit of flattery: "So likewise ye, when ye shall have done all these things which are commanded you, say, We are unprofitable servants: we have done that which was our duty to do." A man is in poor business when he is bragging of having done his duty, and none of us will claim to have done more than our duty on this Board. But I have cast a hasty glance over some of the fields in which the Board has wrought, for the purpose of bringing more clearly before you this inquiry, *What subjects in the immediate future demand the consideration of this Board?*

I do not propose to bring before you all the subjects which might properly engage your attention, but to call up some matters which I believe may well command consideration at your hands at this time, or in the immediate future.

I.—STANDARD WORKS ON HYGIENE FOR PUBLIC SCHOOLS.

The law says, "They shall from time to time recommend standard works on the subject of hygiene for the use of the schools of the State." So far from doing this "from time to time," we have not done it once. It seems to me that the imperative declaration of the law should be obeyed—unless obedience is impossible. The Secretary has been accumulating works on hygiene in our library, and it may be found that some of these are standard works fit to be used in the public schools. It may be found on examination that none of these works are of such a kind as to be well adapted for use in the schools. If this is the difficulty in the way of obeying the law, let us frankly say so and vindicate our law-abiding character. By pointing out the want of such a work on hygiene for use in common schools, we may possibly stir up some one to prepare such a work, and thus aid the cause we all have at heart. I recommend that this portion of the organic law be referred to a committee to report to this Board at an early date, either by recommending standard works on Hygiene, or by pointing out the inability of the Board to comply with the law.

II.—UTILIZING ACQUIRED MATERIAL.

Whenever information on subjects related to the public health has accumulated in such quantity that valuable results may be drawn from the study of the same, such results should *early* be given to the people. I emphasize the early publication, because of the temptation to hold back such results on the plea that the observations are still incomplete; but from the nature of the case such observations will forever remain incomplete. This is especially true in reference to observations on the physical conditions that influence the public health. It is said, for example, that the mean temperature of a place cannot be determined short of 25 years' observations, and even then it is not absolute but approximate. Shall we therefore make no attempt year by year to find the mean temperature of a place? The questions of health and life are not bounded and fixed by lines of mathematical precision; they fluctuate with the lines of approximate truths. I do not suppose that in attempting to garner some grain from these fields of physical inquiry we shall at once reap a rich harvest, nor that, as in tropical groves the shaken tree drops alike the golden orange and the fragrant flower into the outstretched hand, we shall gather the fruits and flowers of knowledge without toil or weary effort; but rather shall we gain the golden grains of truth as the miner, who washes away a mountain of concealing dirt to gather the little heap of precious glittering dust.

While fully aware how liable we are to run into error by deductions from too limited observations, I yet urge that some effort should be made to utilize these records, even though the results could only be regarded as tentative. He that soonest uses information will soonest acquire additional information. Nothing is more discouraging to an observer than to see no results issuing from the observations of many years. I have taken and forwarded to the Smithsonian Institution meteorological observations for the last 15 years without seeing that any use was made of them. I have reduced these observations to tabular form and published them for 15 years, with the settled conviction that not a score of men in our State have ever looked at these records or made the least use of them. From my own experience, therefore, I am convinced that an observer needs either great enthusiasm in his calling, or else some appreciative use of his work, to continue his pains-taking observations year after year.

We have a small corps of observers of the meteorology of our State, embracing the daily temperature, moisture, barometric pressure, atmospheric ozone, the rain-fall, cloudiness, etc. These report monthly. We have another body of observers who send in weekly reports of the prevailing diseases of their several localities. What relation do these reports of the medical and meteorological observers bear to each other? Is there any causal element in the meteorological conditions which produces effects in the sanitary conditions? We shall undoubtedly find that the curves of temperature have a marked control over certain diseases, that a sharp rise of temperature increases diseases of the digestive system, while a rapid fall of the temperature increases diseases of the respiratory system. Statistics from many lands would lead us to expect this in our land. But let us not be content with this meagre result, let us push on to see if other causal relations may not be discovered. What influence has the presence or absence of atmospheric moisture on diseases of the respiratory, circulatory, or nervous systems? Is there any relation between the presence or absence of atmospheric ozone and the prevalence or absence of any disease? Does the amount of cloudiness have any influence on diseases of the nervous system? Do the barometric fluctuations have any effect on the circulatory and nervous systems?

These are some of the questions I hope to see brought before us by the combined study of our meteorological reports and of the weekly reports of prevailing diseases. I am not sanguine that the results will be apparent at first inspection, or that we shall reach any results without prolonged and careful study, even if we shall ever be able to satisfy ourselves on all these questions. But I am convinced that if the relations of these climatic conditions to the public health are ever determined, it will be by the combined study of meteorological conditions *and the prevailing diseases,* rather than by comparison of meteorological conditions with the mortuary records. A wider scope must be given to the study of vital statistics before results of the highest value are reached. I am glad to know that our hard-working Secretary has a part of this work already in hand.

I wish to see the meteorological reports combined with the vital statistics of all localities in our State as soon as practicable, for the reason that if these records accumulate year after year without any effort to use them, they soon become a mountain of rubbish, an incubus rather than an inspiration.

III.—VITAL STATISTICS.

In defining the duties of the Board, the law says: "They shall especially study the vital statistics of this State, and endeavor to make intelligent use of the collected records of deaths and of sickness among the people." State medicine has its foundation in the vital statistics of a people: the *tripod* from which the oracles of sanitary science are uttered, rests on the three-fold record of births, marriages, and deaths. It becomes, therefore, a matter of necessity, as well as a requirement of the law, that we should study these records, if we would promote the health and safety of the people.

The first and indispensable quality of statistics is *accuracy.* If the records upon which the vital statistics are founded are notoriously imperfect and inaccurate, the deductions drawn from such records will be proportionally unreliable, if not actually misleading. The causes of this inaccuracy inhere in the present mode of collecting the returns of births, marriages, and deaths. These have been brought to the attention of the Legislature, but without securing such changes in the law as seem necessary to secure full and reliable returns. By a few changes in the law, these returns could be made much more accurate, the work of compiling and editing the returns would be simplified, the vital statistics would be more valuable in themselves, and could be much earlier given to the public,—results very desirable to secure.

I recommend that the Committee on Legislation in the Interests of Public Health, and the Secretary, who is by law the Superintendent of Vital Statistics, be appointed a committee to prepare a bill which shall embody the changes required in the present law, and to bring this subject before the next Legislature.

IV.—GENERAL CIRCULAR ON DISINFECTION.

One of the principal duties involved in "the general supervision of the interests of the health and life of the citizens," is to guard against the dangers of self-propagating diseases, or to prevent the spread of such diseases when they occur. One of the most important agencies in this latter work is the destruction of the communicable property of such diseases inhering in the dwellings, clothing, etc., of persons attacked by the disease. This requires the use of disinfectants. But the methods and uses of disinfection are so similar, whatever may be the self-propagating disease, that it seems to me that a general circular, giving full directions and precise instruction in regard to the methods of disinfection to be employed in every self-propagating disease, should be prepared and issued by this Board. It seems to me that the whole subject of disinfection could thus be treated more satisfactorily than by repeating these directions over and over again with every circular issued in regard to contagious diseases.

V.—PRESERVATION AND PREPARATION OF FOOD.

"What shall we eat, and what shall we drink," are questions daily recurring in every household in the State. These questions do not come up mainly with reference to the gratification of the sense of taste: the health, the mental activity, and the effective force of the people depend very largely upon the food they eat. I am well aware that some persons regard it as gross and sensual to intimate that intellectual and moral activity bear any relation to so material things as beef and bread; but we may safely dismiss all sublimated nonsense about "the soul living above the body." The law of the conservation of energy shows that force can be evoked only by the conversion of some other form of force. The soul can live above the body only by living out of the body, and over that condition of existence the State Board of Health does not have "the general supervision."

America is the land of abundance; no other nation in all history has been more bountifully supplied with food-materials. Probably no other nationality has such rich provisions and such poor food as Americans. In my opinion, the question of food and its preparation for human use has more vital relation to the health and welfare of our people than all other physical causes combined. Leaving out of consideration the necessity of food to sustain life, badly cooked and ill-digested food is the cause of more ill-health, waste of time, loss of effective labor, whether muscular or mental, than all the combined diseases of adult life. The question of food relates to *every-day* life, while sickness pertains to exceptional periods in the life of our people. Errors in diet become the direct or remote cause of a great many diseases of the nervous and the circulatory, as well as of the digestive system; and they intensify the activity of many diseases which they do not cause. If our people could be taught to preserve and to prepare their food so as to secure the best dietetic results, preventive medicine would have won a grand victory. It could no longer be said that our appropriate monument would be *a frying-pan*, and our epitaph, *Saleratus!*

What the people need is not a cook-book, calcimined with French names till a plain man after ordering a dish is in doubt whether he shall receive a boiled egg or a pickled frog. I think our food would digest just as well, if it was eaten in English. What is wanted is a tract which shall state the principles and methods of preserving food-materials so as to suffer the least change or loss of nutritive and digestive qualities; and the principles and processes by which such materials are converted into wholesome, palatable, and digestible food.

It is much easier to point out a want than to supply the want, and perhaps we may wait some time before such a tract will be prepared for the use of our people; but if we can push our preventive measures back even of the formative stages of disease, we shall do much toward securing a condition of general if not of universal health for our people.

VI.—SANITARY SURVEY OF THE STATE.

I call your attention to the necessity of a sanitary survey of the State at an early date, with some hesitation, because it is too great a work for the Board to undertake unassisted, and especially without an appropriation of money by the Legislature to defray the necessary expenses of such a survey. Yet this is a work in which the Board is deeply interested, and it is a work which must be done before the highest interests of the State, in a sanitary point of view, are subserved. Take the one subject of the relation of water to the public health: in a State where the public surveys designate about one-ninth the land surface as swamp, with innumerable small lakes and a very large number of small streams and rivers of moderate size penetrating the interior in all directions, none of them so large that they may not readily be obstructed by dams, bearing in mind that while swiftly running streams and deep lakes with banks free from marsh are agents of health, but that stagnant swamps and sluggish streams, whether the retarded current is natural or caused by artificial obstructions, are agents of disease, and that such sluggish streams may be needlessly formed in the midst of cities and villages, when by a little forethought they might have been kept at a safe distance from centres of dense population,—we begin to see how much benefit a sanitary survey may confer upon the whole people of our State. But to secure the greatest public benefit with the least private loss, it is necessary that this sanitary survey should be made before capital is invested extensively in works which from their nature or position must prove detrimental to the public health. For instance, it has been quite common in this State to build milldams in such positions that the health of a large part of the community soon requires the removal of the dam; then arises costly litigation, which if unsuccessful, leaves the nuisance unabated, and if successful causes the waste of property by destroying the mill. How much better to have it determined with reference to the public health where a mill may or may not be built.

The drainage of swamps, which has been undertaken solely for the reclamation of soil otherwise incapable of cultivation, has yet benefited the public health to such an extent as to have paid in money value on this score alone all that the drainage ever cost. If so much benefit to the public health has been secured by drainage undertaken solely for agricultural reasons, may not still greater benefit to the public health be secured by drainage undertaken for sanitary reasons?

The subject of the pollution of streams by sewage is a question of great importance in reference to the public health; but it is one that must be considered and settled before sewer systems become practically beyond control on account of the large outlay of money necessary to effect a change. The inertia of cities and corporations on such subjects, when any radical change involves the throwing away of the large sums already invested and the expenditure of still larger sums in new systems, and all for so intangible and impersonal a matter as the public health, will prove an impassable barrier to desirable changes in the future. Detroit adopted a sewer system by which the sewage of the whole city was poured into the Detroit River. When anything was said about the contamination of the river-water, and that this water would become unfit for use by those living on the banks of the river below the city, the reply was ready that it was not possible to pollute such a mass of water by any amount of sewage. But the country above Detroit is becoming thickly settled; large villages dot the river bank, and manufactories of various kinds are springing up along the river; and the sewage from all these is poured into the river from which Detroit draws its water-supply. Just now there is no little excitement in the City of the Straits concerning contaminated water, and the fear is expressed that when the population along the river above Detroit becomes greatly increased the water of Detroit River will be unfit for domestic and potable use.

A similar trouble may yet vex the people of Lansing. The Grand River flows from Jackson through Lansing: this stream receives a certain amount of sewage from Jackson and this polluting material is reïnforced as the stream flows past the State Prison, where the night-buckets of all the prisoners are emptied into a sewer which at once discharges the excreta of nearly 1,000 men into Grand River. I can see no necessity of this pollution of the river, for all this excremental matter might be sold to farmers for manure and removed without any expense to the Prison authorities.

Other proofs that a systematic pollution of our rivers has already been begun in our State might be brought forward, but they are not necessary; for any one can easily see that these evils will come in with an increase of our population, unless they are excluded by timely precaution on the part of the public authorities. The evil can be successfully resisted or averted only by early and combined opposition. RESIST THE BEGINNINGS OF EVIL is the demand of sanitary science on this subject. But some system of sewerage must be introduced and some means of disposing of sewage must be devised, on account of the demands of increasing population. These considerations tell strongly in favor of an early sanitary survey of the State.

The Rivers' Pollution Commission of England and the Committee of the State Board of Health of Massachusetts to "investigate the question of the use of running streams as common sewers in its relation to public health," show that such efforts to preserve the streams as rivers of life, are no novelty in this age. We are laying the foundations of a mighty empire, and its corner-stone should be PUBLIC HEALTH.

A sanitary survey will cost money. I know the people hesitate about voting money for such intangible objects as they consider sanitary matters to be; but *nothing is so ecomical as health, and nothing so wasteful as sickness:* a true economy will freely expend money to secure health.

VII.—SANITARY CONVENTIONS.

With a good deal of doubt and hesitation, I bring one more subject before you; namely, the holding of sanitary conventions, or meetings in different parts of the State, to consider and discuss sanitary matters. At these meeting papers shall be read by members of the Board, and others who are desirous of promoting the public health,—the papers to present in popular form the more salient points of sanitary science; the discussions following each paper to be open, under proper restrictions as to time and question, to every person who either has information to impart, or who desires to gain information on the subject under discussion.

I hesitate in presenting the subject of sanitary conventions, for three reasons:

1. They are an untried experiment. I know we have the American Public Health Association in which men who have made a special study of sanitary science read papers and discuss subjects relating to the public health. While recognizing the great value of these papers and the excellence of the work done by the American Public Health Association, I only insist that these Sanitary Conventions occupy a different ground, in that *the sanitary laity* are represented, both in the papers and discussions, and the work is not confined to those who have made such matters their principal study. It may be said that the effort to popularize sanitary matters and to bring them down to the comprehension of the masses,—to make these topics such every-day and common-place affairs as that they shall enter into the daily thought and conversation of the common people to such an extent that their daily lives shall be modified and improved thereby—will be to degrade science and profane her mysteries. True science is never debased by contact with those it was sent to bless and save; and for one, I should be glad to see the day when these questions that lay hold on life shall be as freely discussed by the laity as they are now by the experts in sanitary science.

2. They will throw a large amount of work upon the members of the Board, and will make no inconsiderable demand upon their time. But unless all the members of the Board will give to these Sanitary Conventions all the labor and all the time their successful prosecution will demand, it will be useless to inaugurate the system. Knowing how much of labor and of time is now given to the public by members of the Board, I hesitate to ask of them still greater sacrifices of the same kind. For all such labors, the sense of benefits conferred upon the whole people must be its "own exceeding great reward;" for the State has no other that it will offer you.

3. These meetings may prove a failure from want of public interest in these subjects, or because we fail to properly present the facts and principles of sanitary science.

These are some of the considerations which would lead us to hesitate about attempting the untried experiment of holding such meetings.

On the other hand there are certain possible if not probable advantages which might be secured by such means.

1. We may in this way interest the people in sanitary work. I fear the work of the Board never really reaches the mass of the people. Six thousand Reports indeed are printed and distributed every year, but among a population of 1,500,000 this would be one copy for every 250 persons. But even of those who receive a copy of the Report, I fear that but few read it and master its contents. Somehow the people have learned to look upon "Pub. Doc's" as *literary lumber*, well adapted to fill an aching void on the library shelves, good to keep, and good for naught else. From the Patent Office Reports of the general government down through the documents "By Authority" of State governments, the public seem to regard them as official offscourings. But the State Board of Health that only reaches and influences the few, and comes short of benefiting the mass, fails of its duty: it is "the interests of the health and life" of the people that we are set to guard. I do not think this end could be

secured by merely issuing an increased number of copies of our Report. Certainly we could not ask the government to print a copy of the Report for every individual or even every family. There are other ways by which to reach the public ear, and one is by the public press. The State Board of Health needs recruits to win victories in sanitary science in every hamlet in our State; but no recruits from other quarters can equal in wide-spread influence the ubiquitous secular press. Just so far as we bring sanitary matters into popular form suited for publication in newspapers, I have found the press of this State eager to place them before their readers. By the public press we may reach every hamlet, aye, every household in our State.

2. We may in this way not only interest the people in our work, but induce them to practically apply the sanitary principles already brought out in our Reports and circulars. There is in every people a social inertia, a disposition to let things alone, a conservatism which regards everything as "good enough, well enough, time enough," which is the enemy of all progress. But if we can show the people that the dangers from the neglect of sanitary precautions—from the use of low-grade kerosene, of unventilated rooms, foul cellars, contaminated wells, ill-kept privies, from contagious diseases, etc.—are not distant and fanciful dangers, but that they threaten them now and in their very homes, that they walk by their side or dog their footsteps wherever they go, we shall break up this apathy and cause people to act,

> *Act in the living present,*
> Heart within and God o'erhead!

3. Another benefit from holding sanitary conventions will be that we shall secure the active coöperation of physicians and others interested in sanitary matters. We may hope to secure papers of great value from this class, which will add to the value of our Report. By securing the assistance of sanitarians in the convention, we shall also secure their aid out of the convention in all sanitary matters in their vicinity. The sanitary convention will thus reäct upon the public, setting many persons at work in different localities in the promotion of sanitary reforms.

By mingling with sanitarians in different places we shall best learn what work immediately requires to be done to promote the public health.

4. Another benefit which may be secured by these sanitary conventions is to exhibit and illustrate sanitary appliances, and to make the people practically acquainted with those that are now in use. Many sanitary appliances of much value confer but little benefit upon the public, because they are unknown and hence unused. No suitable means are now offered by which people may become familiar with the nature, kinds, and uses of devices designed to secure conditions of both health and comfort. Nor have the inventor and the manufacturer of sanitary appliances any direct means of bringing them to the notice of the people. At our agricultural fairs the inventor and the manufacturer of labor-saving machinery of every kind find a ready means to bring their implements to the notice of the public: the farmers also find there an opportunity to see the machinery, see it work, and how it works; to compare one machine with a competing machine, learn the price, where it can be bought, etc. In the same manner, let us bring the manufacturer of sanitary apparatus and the health-lover and health-preserver together, to the mutual benefit and enlightenment of both. Let us make the sanitary convention a sanitary fair, where may be exhibited every kind of appliance which directly or indirectly promotes

the health and well-being of the people. I would not restrict the exhibition to sewer pipes, ventilating cowls, and nose-skinning disinfectants. A good cookstove is eminently a sanitary appliance; an improved sauce-pan or soup-kettle, a better can for preserving fresh fruit, a better lamp for saving our eye-sight, are each and all sanitary instruments. In short, any thing which will give us better food, purer air and water, cleaner clothes, sweeter and more restful sleep, is a sanitary appliance. The danger is that we shall make the field of our exhibit of sanitary appliances too narrow, instead of too broad.

5. Finally, in carrying out any sanitary reform, we need and must have the aid of the women of our State. When I make this statement, do not hastily suppose that I add my voice to the crowd who are shrieking for "woman's rights." I do not believe that our political and social evils are to be expiated by immediately putting forward woman as the sacrificial victim, following the example of Minos who exposed the Athenian virgins to be devoured by the Minotaur. Do not suppose that I advocate any such change in the constitution of this Board as will place representatives of the female sex among our number. I do not suppose that the efficiency of our Board or the success of our work would be promoted by such a change. But there are other fields where not one or two, but all the women of our State may aid this work. Whether we regard the objects of sanitary science as the removal of the cause and limiting the spread of diseases, or as the improvement of the physical condition of the people, in either work we need woman's helping hand. Woman makes the home, for her life is there: and the appliances and conditions of comfortable living come from her plastic hand. Except in his sleeping hours, man spends but a small fraction of his time in the house: he merely contributes, in their crude form, the materials for the family support, while it is the deft hand of woman that transmutes these dead materials into the family living.

In the introduction of most sanitary reforms among the people, we must rely upon the active, hearty, and intelligent coöperation of woman. To secure this, we need to awaken her interest in such reforms and cause her to comprehend the nature, scope, and needs of such reform. All these can best be accomplished by the presentation of sanitary principles in popular form, which can effectually be accomplished in these sanitary conventions. Whatever woman may have to contribute to the stock of sanitary science can be appropriately brought forward in these meetings, in which I should hope that women as well as men would be encouraged to take an active part.

The work of a sanitary convention must be confined to sanitary work. All questions of party politics, of denominational theology, and of curative medicine must rigidly be excluded both from the papers and the discussions. The field of preventive medicine and of the improvement of the physical condition of the people is broad enough to consume the entire time and attention of a sanitary convention.

Such are some of the features of a sanitary convention as the thing has formed itself in my mind, and such are some of the considerations for and against your undertaking such a work. Perhaps it is wild, visionary, and impracticable; I do not ask you to adopt it at sight; I hope you will not reject it without consideration. The most I now ask of you is to appoint a committee, of which I shall not be a member, to carefully consider the whole subject, and report at some future meeting.

In all our plans for future effort we are not to forget that our work is advisory, not mandatory. We command nobody but ourselves. In the legislative discussions which preceded the organization of the Board it was objected that the proposed Board would have no power to enforce its precepts, and hence would be a harmless thunderbolt. But among a free people the surest if not the quickest way to remove any great evil is to clearly point out the evil itself, its extent, and its effects; many interests, injured or at least threatened by the evil, without concert silently place themselves in opposition; a thousand eyes at once are turned to the examination of this evil and its tendencies; the social forces and instincts rise up in serried ranks like the armed warriors which leaped forth from bush and stone at the whistle of Roderick Dhu; that wonderful and complex phenomenon which we name "a change in public opinion," ensues, and the evil finds it must take itself out of the way, for it has no home amid a hostile people. In this way the wrongs which threaten society in mass, right themselves when brought to the bar of enlightened public opinion. Such rectifications are the more permanent and abiding because they take place by the action of natural laws, and not by the exercise of arbitrary authority. The silent forces are the most powerful; the noisy and loud-mouthed forces dissipate half their energy in the very noise itself. The boom of the cannon is *brag* but the silently whirling cannon-shot means *business*. Many persons seem to feel a sort of contempt for the sunshine—"good and useful, but so weak and powerless"—the strongest name by which they call it is "the *gentle* sunshine;" yet before the flashing lightning and rolling thunder the same persons turn pale with awe "because they are agents of such terrible power;" whereas the sunlight exceeds in energy, a thousand fold, the lightning, and, but for the hiding of the power of the sunlight, the lightning itself would die still-born.

The office of this Board is not to convulse the community with lightning-shock, but to let in the sunlight, which, "silent as the footfalls of time, yet resistless as destiny," shall mould and fashion the very conditions of life in our State.

AGRICULTURAL COLLEGE, April 3, 1878.

REPORT ON PUBLIC HEALTH SUBJECTS

IN THE PROCEEDINGS OF THE

AMERICAN MEDICAL ASSOCIATION,

At its Annual Meeting at Buffalo, N. Y., June 4-7, 1878.

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— BY —

HOMER O. HITCHCOCK, M. D.,

Of Kalamazoo, Member of the Michigan

STATE BOARD OF HEALTH.

AMERICAN MEDICAL ASSOCIATION.

REPORT ON THE PROCEEDINGS OF THE AMERICAN MEDICAL ASSOCIATION AT THE MEETING HELD IN BUFFALO, JUNE 4 TO 7, 1878.

In compliance with the request of this Board, I attended the meeting of the American Medical Association, and now submit the following report of the proceedings of that body.

The attendance was large, there being representatives of the medical profession from nearly or quite every State in the Union.

The general meetings of the body were spirited, and, I think, of more than usual interest. The same was true of the meetings of the sections, except perhaps those of the section on state medicine and hygiene, some at least of the meetings of which were thinly attended and lacked in papers and in interest. The attendance at the meetings of this section was in marked contrast to the increasing interest in state medicine manifested in the general meetings of the body, and shows that there is a field and a necessity for such a body as the American Public Health Association, in which all persons really and practically interested in state and preventive medicine can come together for the special purpose of discussing matters germane to that subject. The members of the American Medical Association are generally more especially interested in subjects falling within the scope of the other sections, and usually show where their interest is by their attendance; and the medical profession as a whole has not yet been fully inspired with the idea that state and preventive medicine is not only the broadest, but the grandest field in which medical men can labor.

I am glad to report, however, that in the president's address, as well as in the several papers read before the sections, we had marked proof that from year to year more laborers are entering this field and devoting themselves to its collection *con amore*.

The President, Dr. Thomas F. Richardson, of New Orleans, gave an able and interesting address, one-half or more of which was devoted to matters pertaining to state medicine and hygiene. This subject he considered the most important that had ever come before the association. He said that although physicians, "as mere citizens, are no more nearly concerned in the development and application of its great powers for good than are all others, for it touches every class and every individual in the community, nevertheless, it devolves upon us as philanthropists, and as the self-constituted instructors of the people in regard to health and disease, to awaken the public mind to the fact that, as matters now stand, human lives are daily sacrificed at a most fearful rate; and that by concerted and well-directed efforts this sacrifice may be materially arrested. As humanitarians, as moralists, as Christians, we cannot willfully shut our eyes to the unnecessary sickness, suffering, and death which are taking place around us; we cannot quiet our consciences by *ex cathedra* enunciations of the natural laws by which health may be preserved and the spread of sickness prevented; we must continue in the lead of all public movements directed to this end, and endeavor to draw to our aid *all the influence of the people* and *all the powers of the State.*"

He spoke of the increasing interest in this cause as manifested in almost every quarter. Of the twenty State Boards of Health already existing, nine have been created since the Am. Med. Association, "by formal action in 1875, made its first appeal to the executive officers of the different States to take action in this matter."

While aware of the almost inspirational interest awakened in the minds of nearly all physicians in "this great crusade," when reading the papers presented to the American Public Health Association, and to some of the State Boards, he yet feared that "the opinions in regard to these matters, held even by a large number of our medical men, as well as by the public in general, are rather indefinite and misty." For this reason, he pointed out the objects of state medicine, as he understood them, as threefold; viz.,—

1. "The prevention or arrest by official measures, of all diseases which are not in their nature strictly limited to the individual, but which, from external causes or from specific characters, have a tendency to spread throughout families, institutions, and communities, and which cannot be otherwise controlled. This is the aim of public hygiene, which is the first grand division of state medicine.

2. "The qualification of men by suitable education for the duties involved, not only in the practice of medicine, but also of public hygiene, the State not only directing the studies which they shall follow, but determining by examination when they have reached the standard of acquirement necessary for the proper performance of their great trusts.

3. "The enactment and enforcement by the State of such laws as shall secure to every citizen the benefit of the services of the best professional experts in all questions of a medico-legal character.

"In brief, state medicine may be considered to include public hygiene, medical education, and medical jurisprudence, to which may be added the establishment, control, and sustentation of public institutions for the sick and infirm."

Notwithstanding the vast extent of this domain and the numerous branches into which it is naturally divided, he believed it susceptible of reduction into a complete system, as has already been so well done in England, "where public hygiene, at least, occupies its true position in the organic law of the land, the principle being recognized that the private citizen, however humble, is as justly entitled to protection by the State against the enemies of his life and health as against murderers and highway robbers. * * * The same is true of Prussia, with reference to medical jurisprudence, where the obscurest plebeian when brought before a court can command the ablest counsel in the State on all questions of a medico-legal character."

In speaking upon the very general ignorance of the laws of hygiene and the prevailing indifference as to their enforcement, he said: "We see daily lamentable proofs of the fact, not only in the personal habits, vices, and surroundings of the poor, but also in the dissipation, dress, and dwellings of the rich; not only in ill-ventilated factories, mines, jails, and poor-houses, but in churches, hospitals, hotels, asylums, and school-houses; not only in the filthy streets and sewers of cities, but in the malarious swamps and stagnant ponds of the country."

That laws on this subject may be wisely enacted and efficiently executed, it is of prime importance that the people who make and execute them should be educated in the principles and laws of life and hygiene, to a sufficient extent to enable them to appreciate the necessity of making and enforcing such regulalations as are known to promote health and to remove the causes of diseases and to limit their sphere.

"Properly directed public education is, I insist, essential to public health, and every scheme for the promotion of the latter which is not founded upon the former must inevitably fail;" for, as Tyndall asserts, "If anything is to be done in the way of really great sanitary improvement, it must be from the people themselves." In view of the necessity of educating the masses in the principles and practice of hygiene, he very pertinently asked, "How shall they hear without a preacher?" and he added, "Knowledge abides alone unless it be forced into the ranks below, and it is the bounden duty of those who possess it to make provision for its diffusion. Sanitary science is no exception to the rule. It must be taught,—taught in the family, in the infant-school, in the public school, in the academy, in the college, in the University; taught in the workshop, in the factory, in the church, in the forum, in the legislative halls; taught in the city, taught in the country, taught everywhere."

It appeared to me that the suggestions of the President of this Board in his recent address, in respect to the practicability of educating the people of Michigan in these subjects by holding in various parts of the State "institutes" for the purpose of having subjects of practical hygiene and state medicine presented by experts and afterwards discussed by the people, could have no better seconding than by the preceding words of President Richardson. "We have," said he, "Our Bowditches and Shattucks and Cabells and Bakers and others of like wisdom and zeal to direct the great work; but we need missionaries and colporters who will go into the streets and byways and teach the truth of the new way, persuading all who will listen, that health and long life are possible to multitudes of those who now sicken and die before they attain to the age of maturity. He believed that, for the present at least, these teachers were mostly to come from the medical profession. He deprecated the fact that, at present, many graduates of our medical colleges were so poorly educated in the very first principles of hygiene, and urged very strongly the importance of the establishment of a chair of state medicine and hygiene in every medical college, and that a thorough knowledge of its principles and an ability to apply them should be required of every candidate for graduation. He thought the laws of hygiene, and the principles of physiology which are essential to proper comprehension of those laws, should be taught in our public schools, with geography, grammar, arithmetic, and history, "so that a boy or a girl ten years old should feel as much disgraced by ignorance of the principal organs of the body and of their functions, as by ignorance of the difference between an island and a lake, or a mountain and a valley."

While listening to this portion of the President's address, I could not help asking myself if this Board had not failed to do its whole duty under one clause of the second section of the act establishing it, viz., "They shall from time to time recommend standard works on the subject of hygiene, for the use of the schools of the State." Has this ever been done by the Board? Have we ever asked, in fact, if a good book for schools on those subjects has ever yet been written? Is not the preparation of such a book a possible duty of this Board?

In the section of state medicine and public hygiene, Dr. Bowditch read an interesting paper, "Studies of an Epidemic of Diphtheria which prevailed at Ferrisburg, Vt., in 1877." From his careful observations in that epidemic, the Doctor derived a number of conclusions almost identical with the principles and cautions which I embodied in a report to this body, in April last, in response to previous instructions from this Board to prepare a circular for publication and distribution among the people, on the "Prevention and Restriction of Diphtheria." I was much gratified that so able a hygienist as Dr. Bowditch should have arrived at almost the same conclusions that I had; but I was obliged to feel a chagrin that, although my paper was before this Board in April, it has not yet been published, and now, when published, will appear, perhaps, to have been borrowed from Dr. Bowditch's paper, read two months later.

By far the ablest and, as I think, greatly the most important paper before this section was that read by Dr. E. Seguin of New York, on the "Intervention of Physicians in Education."

Towards the close of his paper he termed it an "invitation to physicians to take their natural part in education."

"Some," said he, "put the riches of this country in its mines; some, in its commerce; some, in its manufactures; some, in its innumerable breadstuffs; some, in its inexhaustible herds; but do not believe them. The true riches of this country, without which all others are like chips in the mouth of the hungry, are our children, *if physiologically educated.*"

Since, now, instead of scores of children, multitudes *en masse* have to be educated, our old district school system, "ever a model for less advanced nations," has been outgrown and needs reforming; and the "curriculum of our schools must be enlarged to meet the demand of the American people for complete development of their destiny. * * Our present schooling—superfluous in some things—barren in others,—has, besides many government leeches, turned into stores and out of the farm and skilled manufactures more able-bodied drones than it is healthy for a nation to feed in girls' occupations."

Although Rousseau taught that every man should have a fair education *and a trade,* and Prince Albert brought up each of his royal sons to a trade, yet it is but recently that the idea "that everybody must be educated to produce enough for his own wants and those at least of a wife and child, or of an aged or crippled relative, lighted up our moral atmosphere like a revelation. * * * This new social element (or idea)—as indelible as a baptism—must take the child at his entrance into school and carry him through it and out of it *stronger, healthier, and better fitted for the enjoyment of his liberty.* That will be the gain of a physiological education." To secure this, the school-physician should, *First,* have complete supervision of the school-building and grounds—the desks—the books and charts—as to type, as to the arrangement of the desks in reference to the light which enters the room, and as to the shape of the seats.

Second. Before entering the school, the pupils must be scrupulously examined and their status minutely recorded, as much as possible in figures, * * * in regard to their whole general appearance and physical condition, both positive and relative; and remarks should be made on the influence which the physical conditions of each pupil must have on his or her general and special training in school,—what should be avoided and what encouraged.

Third. The physician should direct as to the type in which the classbook should be printed (a very important point, and one now wholly neglected, the most economical type to the publisher being always the one in which school-books are printed), and the place in relation to the teacher, the apparatus, and the light, in which the pupil should sit, so that myopia may no longer be really cultivated by our schools.

Other physical defects, also, might be avoided or remedied by the careful supervision of a competent physician.

Fourth. "An every morning medical survey is expected of the school-physician," as a quarantine measure, and as a means of discovering simulated as well as dissimulated diseases and injuries.

Fifth. "During the session, and particularly at the changes of season and of temperature, it is important to note the effects of the course of study on the children." In former papers the Doctor had quoted "the fate of scholars killed" by what he termed "the conjestive and the combustive processes of thinking," and he now referred to others still, as the grandson of the physiologist Richerand, and the poet-laureate of Yale College, and a student in the New York Female Normal College.

I am quite sure that many physicians in the larger towns and cities of Michigan can add many cases to this fatal list, which might have been saved if timely, careful, medical observation had been made of the effects of study upon the several victims, followed by wise caution and prudent counsel.

Sixth. Just here the physician must interfere in education; and if the differences in the conditions of the pupils, found by his observations, justify, he must order the pupils out of school altogether, or to a decided change in the course and methods of study.

Seventh. Besides these hygienic and prophylactic duties, the school-physician should "create and organize the *physiological training of the senses* and of the hand as executrix of thoughts, not as a criticism of the intellectual culture, but as its complement." Under such a training, would be developed in the several children their natural tastes, that of the artist, the artizan, or the cultivator, and there would be formed forever the manual dexterities adapted to every occupation.

"By this double accumination of the senses and of the hand, the child has strengthened his instruction by an almost illimitable range of powers *to do best what he will like best.*"

Eighth. The school-physician should keep a continuous record of the vital powers of the pupils, noting in graphics or in figures their progress or retrogression, with a suggestion as to the causes thereof, "so that when the teacher will dismiss the pupil with his certificate of capacity in the branches of learning, the manager of the vital functions will add a summary of his physiological powers of perception, of action, and of endurance,—which is after all the hard-pan of all capacity. In a word, the teacher's certificate will tell what the aspirant to manhood *knows*; and the physician's, what he *can do*."

That such a scheme for public education is not utopian, "its partial realization in an older but less important branch of the public service" is evidence.

"The armies, in other respects barbarous organizations, are fifty years in advance of the school," and are really an instrument of progress in pointing out the necessity of a more physiological education.

In proof of this assertion and to give point to the whole paper, he brought forward two instances, as follows:

"The expedition of Abyssinia suceeded only because the medical staff of the English army had tested the worth of every man by the method of physical diagnosis, and with the instruments of positive observation, allowing none to join the picked band whose temperature, respiration, two pulses and cardiagraphy had not given normal results. So selected, the valor of these men proved to be equal to their worth; their heroism was natural, and the victor of Magdalla was not Hercules, but Esculapius.

"To this achievement of the Anglo-Saxon physician, let us add another won by our Army Medical Corps. To Drs. Woodward, Billings, Baxter, and their associates are due those medical and surgical reports and tables of vital statistics which demonstrate (all previous prejudices notwithstanding) the superiority of size, proportions, weight, and endurance in the field and in the hospital of the neo-American.

"With a living material more numerous and more sensitive to the changes to be observed, when will the American school be able to show something like this last triumph of army medical science? When school-physicians will not be confined to look at the privies, instead of playing in education a part much more important for society at large than that of the surgeon in the army. This improvement will commence when the Laplaces, Aragos, Cuviers, Humboldts, Virchows, and Littres of this country will be the school authorities."

The subject and suggestions of Dr. Seguin's paper were discussed with much interest before the section, and quite extended remarks were made upon it before the main body. The paper was referred to the section on public hygiene, and the following resolution was unanimously adopted:

Resolved, That, in the opinion of this Association, medical men ought to have a voice in the construction and location of public school buildings, on the questions as to the age at which children ought to be admitted, the hours of study, and the general management of these institutions; and to this end it is believed to be necessary that one or more intelligent physicians should be placed upon the Boards of Education, Boards of Trustees, and upon other similar Boards having the control of public education and schools.

Dr. Bell, of New York, then offered the following resolution, which was adopted:

Resolved, That Dr. E. Seguin's paper on the "Intervention of Physicians in Education" be recommended for publication in the transactions, and that Drs. F. H. Hamilton, E. Seguin, R. J. O'Sullivan, of New York; Dr. D. B. Lincoln, of Boston; and Dr. W. H. Van Bibber, of Baltimore, be appointed a committee to report to the Association at its next meeting upon the practical suggestions of the said paper.

I will make no apology for the length of the outline notice of these two most important papers, even though it greatly curtails the notice of several other very interesting papers in various parts of the field in which we labor. These two papers were so pregnant with suggestions for our future labors as to lay out work for us for years to come. It will be long years before the ideas contained in them will be fully understood by, and practically realized among, the people. It is ours to labor for that end. In the words of Dr. Seguin:

"It may be considered hard for men who have spent in studies more than a third of their probable career, to devote the rest to a part of their profession so little remunerative, and so fraught with enmities. But these considerations—though strongly appealing to egotism—are powerless against the fiat of a ripe idea."

Dr. J. L. Cabell, the chairman of the section on state medicine and public hygiene, gave as his address before the general session an elaborate *résumé* of what has been published during the past year, on various subjects included in this broad field; but as his address aimed only to give the outlines of papers published by very many authors, I cannot attempt to give an analysis of it. There were several papers before the section, brought out by a circular letter of the chairman, on the subjects of the relation of disease to drainage, sewerage, and water-supply, which were of considerable interest, but presenting no views that have not been considered and published by this Board.

There were several papers read in other sections, and before the general sessions of the body, that were of considerable interest as bearing on some departments of state medicine and public hygiene. Especially was that true of the address of Prof. Loomis of New York, chairman of the section on practical medicine.

But I fear my report is already too long, and I will only add that on all hands in the association, the position and the work of State Boards of Health were spoken of with great interest and commendation; and I was proud to notice that the Michigan State Board was spoken of by no one as second to any other. All of which is respectfully submitted.

KALAMAZOO, Michigan. H. O. HITCHCOCK.

LEAD POISONING

FROM USE OF

TINNED, GLAZED, AND ENAMELED WARE.

BY

R. C. KEDZIE, M. D.,

PROFESSOR OF CHEMISTRY IN THE

MICHIGAN STATE AGRICULTURAL COLLEGE,

AND PRESIDENT OF THE

STATE BOARD OF HEALTH.

LEAD POISONING

BY THE USE OF TINNED WARE, AND OF VESSELS CONTAINING LEAD.

BY R. C. KEDZIE, COMMITTEE ON POISONS, ETC.

It is well known that there are some substances which are actively poisonous when taken in large doses, but that the same substances when taken in small but repeated doses often produce effects which are so obscure that they may be mistaken for the symptoms of some chronic disease. The metals lead, arsenic, antimony, and copper are examples of substances whose effects may vary according to the quantity taken at a dose and the length of time during which it is taken. The chronic poisoning which may be caused by minute doses of any of these metals, and the possibility of mistaking such chronic metallic poisoning for some disease of a very different nature, should warn us against the use of such metals, or make us careful and guarded in their use. Vessels which are in daily use for the preparation or serving of food, from the frequently repeated influence which they exert, are especially liable to affect the physical condition, if they contain any material which will insidiously sap the foundations of health and strength.

Culinary vessels which are cheap, durable, and convenient, and at the same time without injurious influence on the health, bear an important relation to the public health, and have an intimate relation to the comfort and well-being of the people. Of all cheap metals for such use, tin fulfills the conditions better than any other. It is a comparatively cheap metal, resists oxidation by exposure to both air and water, has a white color and a lustre strongly resembling silver, and it has very appropriately been called "the poor man's silver." It is not readily dissolved except by the strong mineral acids, and the only salt of tin which is actively poisonous is "tin salt", or chloride of tin, which will never be formed in the domestic use of tin vessels. The readiness with which tin may be made to coat over and protect a surface of iron and thus form tin-plate, contributes to its valuable uses. Tin has therefore been regarded as a cheap and safe material for the manufacture of vessels for culinary and domestic use.

Unfortunately, while tin is comparatively cheap and safe, lead is cheaper and very dangerous; yet the two metals will very readily unite and form an alloy which may be used in the place of tin. As a general rule, an alloy will oxidize and be dissolved by acids more easily than will either of the metals of which it is composed. If tin vessels contain a large proportion of lead, the danger of poisoning by the use of such vessels becomes great.

The attention of the State Board of Health has been called to this subject by the following letter from Dr. Edward Dorsch, of Monroe:

MONROE, MICH., Aug. 26, 1877.

Henry B. Baker, M. D., Secretary State Board of Health:

DEAR SIR:—Once in a while I have seen in my practice cases of paralysis agitans, which had been taken for chorea, although other symptoms of poisoning by lead were present. In all these cases, investigation showed that the cooking and eating with tin spoons, or in earthern and iron vessels with a coat of lead, were the cause. Particularly among the poor, I saw iron spoons with a trace of former glazing of tin which was only lead. Many of these spoons have an English stamp.

The same is the case with milk vessels. They are of iron, and have inside a coating of tin (lead), and being in use for years, the children are poisoned systematically, because the acid, which cannot be avoided, dissolves the lead salts, and the children die by tubercles of the brain, meningitis, fits, and paralytic affections.

Grown persons, although resisting longer, must become sick, if the glazing of the cooking implements contains two-thirds of lead.

A similar danger arises from tea and coffee pots of earthenware or of "composition metal," from the tin sieves, and funnels, etc., and from almost all cooking utensils used by the poor.

I know it will be hard to do anything after the vessels have left the factory and are to be found in trade; but I direct your attention only to these adulterations of tin by the too parsimonious manufacturers, and add that they are almost worse and more dangerous than the adulterations of food and spices so common all over our country.

Yours truly,

ED. DORSCH, M. D.

The danger of lead-poisoning so clearly pointed out by Dr. Dorsch, is a matter of great importance, because so large a proportion of our population employ tinned vessels both for culinary and table use, while those who have banished tin from the table, still use it in the kitchen. The alloy of tin and lead will tarnish or oxidize much more readily than pure tin. The oxide of lead is very soluble in acetic acid or vinegar, forming "sugar of lead;" also in lactic acid or the acid of sour milk; it will form salts with malic and citric acids, which are contained in our common fruits, such as apples, cherries, gooseberries, currants, strawberries, tomatoes, etc. Indeed any of our acid fruits when cooked in vessels containing lead, or even when placed in such vessels for some time, are liable to take up lead from such dishes and become very injurious thereby, *because all the salts of lead are poisonous.* These fruits make up a considerable part of the daily food of all classes: add to these, milk, which is, or ought to be, a part of the diet of every person, and we see that quite a large portion of our daily food may be a vehicle of poison, if prepared or contained in vessels containing any sensible amount of lead. The danger is greater because the compounds of lead are *cumulative in their influence.* A person may not be poisoned by one or two small doses, but even if a very minute dose is taken for a long time, the person may be broken in health or even lose his life.

THE DANGER REAL.

I have examined a large number of specimens of tin-plate, of vessels made of tinned iron, of tin spoons, and iron spoons coated with tin, both tea-spoons and table-spoons, and find in almost every instance that the tin is alloyed with lead; in almost every instance the lead was present in some quantity, and often in very large quantity. Nor is the lead confined to the poorer qualities of tin; but some of the highest priced, and "first quality of tin-plate" contains a large quantity of lead. It is an astonishing fact that a large proportion of the tinned wares in the market are unfit to use because of the large quantity of lead with which the tin is alloyed. Nor is this evil confined to this country. Taylor, in his Medical Jurisprudence (Vol. 1, p. 301), says: "An evil practice has lately sprung up of substituting for pure block tin an alloy of tin and lead, in the so-called tinning of iron and copper utensils. * * * Lead may thus be conveyed into food and water under circumstances not suspected. M. Gobley has fully pointed out the danger of this practice in reference to public health."

On page 299, Taylor also says, "One cause of lead-palsy among infants may be the use of farinaceous food wrapped in lead-foil having a thinly tinned surface, sold as patent tin-foil; I have found such infants' food to be strongly impregnated on the outside with carbonate of lead." I have examined several specimens of tin-foil, and find they all contain a large proportion of lead.

Surprised to find almost every specimen of tin contaminated with lead, I next examined some bar-tin, and found that this also contained a sensible amount of lead. Water contained in tanks lined with lead, or conveyed in lead pipes frequently becomes impregnated with lead to a dangerous degree. To obviate the danger in water-pipes, such pipes have been made with a continuous lining of tin in order to get rid of all danger of lead-poisoning; but if the tin was as largely alloyed with lead as my bar-tin which I bought for chemically pure tin, the danger would be obviated in name only,—it would still be real, and might even be the greater because of a deceptive feeling of security.

TEST FOR LEAD.

Fortunately it is very easy to test for lead, and almost every one can satisfactorily determine whether his tin-ware contains lead in sensible quantity. For this purpose, place a drop of strong nitric acid on the tin surface by means of a glass rod or even a splinter of wood, and rub the acid over a space as large as a dime; warm it very gently till it is dry and then drop two drops of a solution of iodide of potassium on this spot; the bright yellow iodide of lead will form on this spot if the tin contains lead. This test can be very rapidly applied, and the results are decisive.

LEADED TIN FOR ROOFING.

I am informed that a peculiar kind of tin-plate, in which the *tinning* consists mostly if not entirely of lead, is coming into general use for tin-roofing, and for the construction of eave-troughs and water-pipes. The lead thus exposed will be in conditions favorable for oxidation, and a quantity of oxide and carbonate of lead will be washed away in the rain-water and deposited in the cistern with every storm. Persons very susceptible to the action of lead may be poisoned by washing in such lead-charged water; and all persons drinking such rain-water, even after it has been filtered, will be in danger of chronic lead-poisoning. The general use of such roofing material must be prejudicial to the public health.

EARTHEN VESSELS WITH LEAD GLAZING.

Earthen vessels are usually glazed to overcome their porosity and render them more or less impermeable by fluids. In many cases this glazing consists of fusible silicates of the alkalies and alkaline earths, in which case they have no injurious influence on the health. The oxide of lead when added to the alkaline silicates, borates, etc., makes a very fusible and closely adhering glazing for such vessels, and for this purpose it is sometimes used. But its use is very dangerous, especially if the vessel contains acid substances, such as pickles with vinegar; the glazing decomposes, and lead salts form which either dissolve or become mechanically suspended in the contents of the jar, and there is great danger of chronic lead-poisoning. This danger unfortunately is so common that I only need to allude to it here.

ENAMELLED IRON VESSELS.

A few years since the tidy housewife was delighted to obtain the "porcelain-lined kettle," which was a cast-iron kettle lined and glazed with a white enamel which would withstand for a time the action of acid fruits. Within a short time a similar enamel has been successfully applied to vessels made of thin iron plate. the enamel or glazing thus taking the place of the tin coating in tin-plate. There are now several manufactories of these wares and a great variety of vessels are made in this way. As these vessels are coming into general use, it becomes a matter of public interest to know what will be their influence on the public health.

Before speaking of the qualities of these enamelled wares, I will call attention to the properties necessary in a safe culinary vessel. A vessel for culinary use must be *impermeable by water and grease.* If watery solution of food-materials can penetrate the substance of a dish and remain there, it will eventually putrefy and become a source of foul smells and possibly of disease; if grease can soak into the substance of any dish, it will become rancid, and this disgusting stuff—foul and ill-smelling as any soap-grease—will fry out when the dish is strongly heated, and will utterly destroy the palatability and wholesome quality of any food with which it may come in contact. It is the incapability for such absorption of any kind of food-material that renders the metals so well adapted to make culinary vessels; it is the capacity for such absorption that renders earthen vessels unfit for baking-dishes unless they are thoroughly purified from time to time by boiling in strong lye. If any housewife will place her much used earthen pie-plates for ten minutes in a hot oven, and when she takes them out will observe what fries out of these plates, and will smell these plates while they are still hot, she will probably arrive at some very definite conclusions in regard to the use of earthen ware for baking-dishes, which will very possibly lead her to deposit such pie-plates in some place of modest seclusion. This evil is more evident when old and cracked table-plates are made to do fatigue duty as cooking-utensils. The same evil is seen when table-plates have been long in use upon the table, and the glazing has become cracked and fissured. The greasy matter of food will soak into such fissured plates and accumulate in considerable quantity unless strong soap or some alkali, such as sal soda, is used in the water with which they are washed. The absolute impermeability by water and grease is one important element of safety in the use of vessels for kitchen and table use; metals, especially where vessels are made without seams or joints, such as "pressed tin-ware," glass, and many kinds of porcelain are admirable in this respect; glazed crockery, after the glazing is fissured, is very poor in this respect.

It becomes a very important question how this enameled ware will comport itself under the action of heat and prolonged use. The enamel of the porcelain kettles cracked and fissured to such an extent as to speedily destroy the value of such vessels, and this probably more than anything else drove them out of general use. If the new enameled ware shall prove satisfactory in this respect, it will be an important acquisition. The material for manufacturing a perfect cooking-vessel has yet in all probability to be discovered or applied; iron is too easily oxidized and dissolved by acid fruits, imparting a disagreeable inky taste; lead, copper, zinc, and their alloy brass, are poisonous; gold and platinum are too costly even when used as plating; glass is too brittle, and glazed crockery becomes too porous by use. Possibly iron vessels with a plating of nickel may yet be found to be the best material; but at the present time the most hopeful outlook for good, safe, and cheap culinary vessels lies in the direction of some fixed unabsorbent enamel for pressed-iron-ware, which will maintain an unbroken surface under all conditions of domestic use. The philosopher who shall place in our kitchens a safe and durable sauce-pan and baking-dish will not have lived in vain.

Another indispensable condition for a safe culinary vessel is that it shall not contain any poisonous material, or anything by which the quality of the food cooked in it, or contained in it, shall be injuriously affected.

I have examined several specimens of enameled-ware to see if they contained any poisonous materials in the enamel. The specimens of "Granite Ware" which I have examined have failed to reveal any poisonous or injurious substance. I removed a quantity of the enamel and ground it to a fine powder, and then treated it with strong mineral acids, but without detecting any injurious substance. I regard the "Granite Ware" as a safe material to use; the only point upon which I fear it will fail is its power to resist the tendency to crack after it has been frequently heated; but I have not made sufficient trial to pronounce on this point.

With the "Marbleized Iron-Ware" I found very different results, as I found the enamel to contain a large amount of lead, and I was even able to obtain traces of arsenic from the enamel by the use of Marsh's Apparatus. In a quart basin of this "Marbleized Iron-Ware" I placed eight ounces of water containing five per cent of nitric acid, heated it boiling hot, and kept the whole in a warm place for 24 hours, when I evaporated the dilute acid to dryness, dissolved the residue in water, filtered, and from the filtrate precipitated the lead. I obtained in this way what was equivalent to 23 grains of lead! In a similar basin of "Marbleized Iron-Ware" I placed eight ounces of vinegar (free from lead) and kept it in a warm place for 24 hours; I then evaporated it to dryness, dissolved the residue in water, filtered, and precipitated the lead in the filtrate, when I obtained what was equivalent to 7 grains of lead. On powdering some of the enamel and treating this with concentrated acids I was able to obtain from this acid solution of the enamel very distinct traces of arsenic. I suppose that the arsenic present was not so designedly but accidentally from being contained in some of the substances used in making the enamel. But a culinary vessel which contains so much lead and in such state of feeble combination that eight ounces of ordinary cider vinegar can in 24 hours dissolve from a quart basin what is equivalent to 7 grains of metallic lead, must be a very unsafe vessel for general use. I regard it as entirely unsafe and utterly unfit for domestic use.

AGRICULTURAL COLLEGE, July 8, 1878.

ON THE SUPPOSED CAUSAL

RELATION BETWEEN CANCEROUS DISEASES

AND THE USE OF

TOMATOES AS FOOD.

BY

HOMER O. HITCHCOCK, M. D.,

MEMBER OF THE MICHIGAN

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON EPIDEMIC, ENDEMIC, AND CONTAGIOUS DISEASES.

CANCER NOT CAUSED BY TOMATOES.

REPORT ON THE POSSIBLE CAUSAL RELATION BETWEEN THE APPARENT INCREASE IN CANCEROUS DISEASES AND THE RECENT VERY GENERAL USE OF THE TOMATO AS AN ARTICLE OF DIET.

A former communication from one of the correspondents of this Board, calling its attention to the somewhat prevalent impression among the people that the free use of tomatoes has a tendency to cause cancerous diseases, was referred to the undersigned, who, having had the same under consideration and investigation, respectfully submits the following report.

The field of this inquiry, so far at least as practical conclusions were to be sought in it, appearing to me to exclude all *a priori* theories about the matter, I thought it best to appeal at once to the honest, unbiased observation of facts by competent observers.

The following circular letter was therefore sent to the regular correspondents of this Board:

[CIRCULAR LETTER OF INQUIRY TO CORRESPONDENTS.]

DOES THE USE OF TOMATOES CAUSE CANCER?

OFFICE OF MICHIGAN STATE BOARD OF HEALTH,
March 12, 1878.

DEAR SIR:—There is a somewhat prevalent popular impression that the use of tomatoes may cause cancer; and the inquiry has been made of this Board by one of its correspondents, whether there may be any causal connection between the very general use of tomatoes for the last ten or twenty years, and the apparent increase in the number of cancerous affections.

If any facts have been observed by you, or if any well authenticated facts have come to your knowledge that may help to settle this question, please state them to us as soon as convenient, and in detail.

Please use the enclosed stamped and directed envelope for your reply.

Respectfully, yours truly,
H. O. HITCHCOCK, M. D.,
Committee.

To this I have received 60 replies, all of which agree that no facts have been observed justifying in any manner "the somewhat general popular impression."

Several of the correspondents have mentioned as a somewhat frequently observed fact that in some cases the very free use of tomatoes does cause ptyalism, occasionally accompanied by ulceration of the buccal or lingual mucous membrane, which in common parlance is called "canker;" and one of the writers suggested that this fact may have given origin to "the somewhat prevalent impression." I cannot do better than to quote a few extracts from the numerous replies received.

Dr. G. W. Topping, of De Witt, writes:

> "I have never seen anything to lead me to think that the 'very general use of tomatoes' caused cancer; and I should as soon think of attributing the prevalence of cancer to the general use of bread.
>
> "I think the apparent increase in cancerous affections largely due to the number of 'cancer doctors' who are traveling the country seeking whom they may pluck. Prof. Heber Claflin, of the North Western Cancer Institute, of Chicago, got $250 from a neighboring farmer for removing a fibroma of the size of a pea from his face, which he assured the farmer was a '*rose cancer*' and very dangerous. Most of the cancer cures heralded are probably of like character. The State permits every charlatan to dupe as many as he can. This is a glorious 'land of liberty,' and the scientific physician should feel thankful that he has as much liberty as the quack. '*Heu pietas! heu prisca fides!*'"

C. M. Stockwell, M. D., of Port Huron, writes:

> "The increase of cancerous diseases if proven, I think not so much dependent upon any particular article of diet as upon the *manner of consumption*."

This remark appears to me to be suggestive of very much important truth, especially in reference to cancerous diseases of the stomach. I should far sooner look for the cause of such diseases in the fact that many people take their food and drink so very hot, and also that the majority of people "bolt" their food without mastication, and in the shortest possible time.

Dr. John W. Falley, of Hillsdale, facetiously remarks:

> "Tomatoes will make cancer as soon as a red thread around the neck will stop the nosebleed."[*]

In the same strain Dr. J. H. Beech, of Coldwater, writes:

> "I have said, in regard to this 'popular impression,' that steel-ribbed umbrellas began to be used about the time that tomatoes became most popular, and might also (and equally) be suspected as the cause of the apparent increase of cancerous affections."

Dr. J. Andrews, of Paw Paw, says:

> "I have never connected cancers with the use of tomatoes as an article of diet; nor do I believe that tomatoes have any more effect in producing cancer than has mush and milk. I regard tomatoes as among the healthiest of vegetables, and those who eat them most, among the healthiest of people."

Prof. E. S. Dunster, M. D., of Ann Arbor, writes:

> "In answer to circular concerning the causal relation of the use of tomatoes and cancerous affections, I would say that I frequently meet with this idea among people even very intelligent and well informed. I have noticed but one instance in my practice where any trace of such a relation could be adduced; and, in this case, it

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[*] On reading this article, Dr. Baker makes the following suggestion: "Dr. Falley does not seem to think that tomatoes will cause cancer, or that a "red thread" will stop the nosebleed; but I think there is evidence and reason for the belief that a "string around the neck," or "around the little finger," or a "cold key on the back" will often stop the nosebleed. They seem to stop it temporarily almost as soon as does ergot, and I believe for about the same reason; viz., the action on the involuntary muscular tissue of the blood vessels, probably through stimulation of the vaso-motor nerves."—H. H. B.

may have been, and very likely was, only a coincidence. It was the case of a monthly nurse who had for years been almost intemperate in her use of tomatoes. She would eat them raw in season and out of season as freely as we would eat fruit. I remember that while attending a patient in my own family, her breakfast was almost invariably prefaced with two or three large raw tomatoes. This free use of the vegetable she had kept up for years. She died at the Roosevelt Hospital, in New York City, of cancer of uterus, of over a year's duration."

This is the only case referred to by all the correspondents, in which was traceable the vaguest suggestion of the causal connection between cancer and the use of the tomato; and in all probability, as Prof. Dunster suggests, in this case the causal connection *dissolves into only a coincidence.*

In accordance with this view, Dr. John P. Stoddard of Albion, writes:

"I believe there is no basis in fact for the question. If there be indeed greater frequency of cancer since the more general use of tomatoes, I regard it as merely a coincidence, just as perhaps I might regard the apparent increase of late of insanity *coincident with the more general use of square-toed boots and shoes.*"

Dr. A. L. Padfield of Saint Clair, while rejecting as utterly groundless the idea of a causal connection referred to in the circular, goes on to make some very candid and judicious suggestions as to the probable causes of the increase of cancerous diseases as follows:

"I would be more inclined to look for the cause in the growth of intemperate habits, in the use of tobacco, and alcoholic liquors, and, it may be, a habit in our young men and women, the increased indulgence of promiscuous sexual intercourse,—all of which tend to a physical weakening of the individual, which, passing from generation to generation, I would be inclined to think had a greater tendency to result in the development of such diseases than has the use of tomatoes. People are more prone to take on disease when the physical system is reduced, than when full of health and vigor; and I believe that men can so abuse themselves as to curse by their folly their children and their children's children, and yet not be within the pale of the orthodox hereditary complaints which are proved facts beyond the shadow of a doubt."

Perhaps the most interesting, to me, at least, was the reply of Dr. Hal C. Wyman, of Blissfield, who says:

"Early in my professional studies, I remember having heard that tomatoes as a diet caused cancer. This information came to me from an eclectic physician. On asking for further information I was referred to the Eclectic Medical Journal of Pennsylvania, for Sept. and Oct., 1871, then the organ of the institution which some years since had its charter repealed for selling diplomas. There I found the article here quoted.

"'TOMATO.—BY PROF. J. D. HYLTON, M. D.

"'In my chemical researches in the vegetable kingdom I am daily discovering new agents. In the tomato I can isolate a pure alkaloid, which possesses cholagogue properties superior to podophylin, leptandria, euonymous, mild and efficient in its action. But in my microscopical researches with this same agent, I have discovered *cells identical with cancer cells, the appearance of the two, the true cancer cell and those found in the tomato, being under the microscope the same.*

"'If this fact is true and can be substantiated by other chemists, it may in some manner account for the fearful increase of cancer in sections of the country where this fruit is cultivated.'"

Of this quoted article, Dr. Wyman remarks:

"This is all that I know in regard to the matter, and I never heard of tomatoes being a probable cause of cancer, prior to the publication of this article. I have taken pains to look up the writings of the chemist, Prof. J. D. Hylton, M. D., and I find him to be the author of a series of articles in the aforementioned journal, which the merest tyro in medicine can readily see are compiled merely after a method of advertising, regardless of any attempt at scientific accuracy."

Now having traced, as I believe, this popular impression of the causal connection of the use of tomatoes as food with the development of cancerous diseases, as the miserable lifeless bantling of a worthy sire, we ask for it a burial, with the institution of which its sire, the "Professor," was a worthy member and exponent.

Respectfully submitted,

KALAMAZOO, MICHIGAN.
H. O. HITCHCOCK, M. D.,
Committee on Epidemic, Endemic, and Contagious Diseases.

CONCERNING THE RELATION OF

WOOD PAVEMENTS AND WOOD SIDEWALKS
TO PUBLIC HEALTH.

BY

HOMER O. HITCHCOCK, M. D.,

MEMBER OF THE MICHIGAN

STATE BOARD OF HEALTH,

AND ITS

Committee on Decomposing Organic Matter, Etc.

WOOD PAVEMENTS AND SIDEWALKS.

REPORT OF COMMITTEE WITH REFERENCE TO THE RELATION OF WOOD PAVEMENTS AND WOOD SIDEWALKS TO PUBLIC HEALTH.

At a meeting of this Board in October, 1876, the following communication previously received by the Secretary was read and referred to the Committee on Disposal of Excreta and Decomposing Organic Matter.

GRAND RAPIDS, MICH., JUNE 26, 1876.

Secretary State Board of Health:

DEAR SIR:—* * * * * * * A certain thing occurs to me that I wish to bring to your attention. It is this: I have seen the laying of wood pavements in cities called in question for reasons well known to us all. Now, if this is a matter of criticism, how much more is it when we see in all our towns, big and little, street after street, where the plank walks and the bearings they are laid on are rotting slowly away. They generally let the bearings into the ground about their thickness, and then put on the plank and shortly the plank is on the ground—no circulation is allowed—and they commence to rot. I estimate that there is at least 100 miles, and probably nearer 200 miles, of 6, 8, 10, and 12 feet wide sidewalks in this city, and all of it more or less decayed. Is not this of enough importance to be brought up at your Board? * * * * * * Respectfully yours,

J. T. ELLIOTT.

Having had the same under consideration, the committee desire to submit the following report:

Anxious to base my report upon as many fairly established facts bearing upon the subject of inquiry as I could gather, I caused the following circular letter to be sent to all of the regular correspondents of the Board, as well as to the health officers of several large towns and cities.

[CIRCULAR LETTER OF INQUIRY TO CORRESPONDENTS.]

WOOD PAVEMENTS AND SIDEWALKS.

OFFICE OF MICHIGAN STATE BOARD OF HEALTH,
March 10, 1878.

DEAR SIR:—Inquiries have been made of this Board as to the unhealthy effects of decaying wood pavements and sidewalks.

For a reliable and practical answer to these inquiries we must draw upon the experience and observation of others.

Will you please give us at an early day an answer to the following questions?

1. In your city or village is wood, either with or without asphaltum, used for paving any of the streets?
2. Has more or less sickness been noticed among people living on streets so paved than among those living on streets otherwise, or not at all, paved?
3. What classes of diseases have more prevailed along streets so paved?
4. Do the streets in your city or village generally have wood sidewalks?
5. Have there been cases of sickness fairly attributable to the decaying wood sidewalks as their cause?
6. In your city or village are any streets made, filled in, or covered, with refuse lumber or sawdust?
7. Have cases of sickness been noticed fairly to be attributed to such decaying wood?

If any cases of sickness have occurred, thought to be caused by such influences, please give them in detail and the reasons for assigning to them such a cause.

Please use the inclosed stamped and directed envelope for your reply.

H. O. HITCHCOCK, M. D.
Committee.

To this circular, I received about seventy replies, answering the several questions as follows:

To question No. 1, twelve answered "Yes;"
To question No. 2, twelve answered "No;"
To question No. 3, there were no answers;
To question No. 4, fifty answered "Yes;"
To question No. 5, fifty answered "No;"
To question No. 6, ten answered "Yes;"
To question No. 7, ten answered "No;"
To question No. 7, two answered "Yes."

It has appeared to me that I could, with great advantage, embody in this report several of the replies received from our correspondents and from others. These are as follows:

Bay City, Mich.—REPORTED BY W. R. MARSH, M. D.

1.* Our pavements are wood, with asphaltum, with the asphaltum in infinitesimal quantities. Our town is quite new, and the pavements are not yet much decayed.

2. I do not notice any more sickness, nor have I heard those locations thus paved questioned, as having any condition of ill-health.

3. ——.

4. Our sidewalks, and many of our streets also, are composed almost entirely of two-inch pine plank.

5. I do not hear of, nor have I noticed, sickness specially attributable to our walks or pavement. Our town is quite generally in an unsettled condition as to roads, and the earth surface; grading, culture, and sewer-making, keep the surface in such a state as to render a reason for our generally malarious atmosphere. I do not think the pavements or sidewalks have yet had any special deleterious influence.

6. Scarcely any of them. The ground is a firm clay. For about 5 miles the mills and lumber-yards, with slabs in piles, occupy from 100 to 500 feet from the river and docks; but the roads are kept quite clear of slab foundations, although the docks are

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* The figures beginning paragraphs refer to questions in the circular on page 42 of this Report.

often from 2 to 5 feet in depth of chips, lath, and waste from the mills. This covers quite a number of acres. We have a few good sewers; and the drainage is each year improving.

7. I would say, no; and yet their slow decay must have its influence, although the sickness is no more, nor in any excess, in such locations.

Too many of our smaller dwellings are standing on posts with pools of water under them, which is left to slowly waste away in the stiff clay, taking half the Summer to dry.

Our town is very healthy. We have no epidemics. Almost every sickness that occurs shows the miasmatic features.

Chicago, Ill.—REPORTED BY DR. N. P. WRIGHT.

1.* It is.

2. Less, to the best of observation, on paved.

3. Natural causes incident to any well regulated city.

4. A large proportion do.

5. Not to my knowledge.

6. There are many filled, to grade, yet from earth or nearly so.

7. No; yet from defective sewerage there has. Diphtheria and other zymotic diseases have occurred, caused by low and defective sewerage.

Detroit, Mich.—REPORTED BY W. H. ROUSE, M. D.

1.* At last report, about a year ago, the pavements in Detroit were 65.34 miles; viz., of wood, 44.91 miles; of cobblestone, 8.31 miles; of limestone, 10.90 miles; of Medina stone, 0.72 miles; of asphalt, 0.50 miles.

Several miles, mostly wood, were laid during last Summer, and are not included in the above. Asphaltum, coal-tar, or some similar substance is generally used with wooden pavements.

2. I have observed no difference in the health of the people along these streets, except about the time when the grading was being done. Then more cases of malarial fevers have been observed, due probably to moving of the ground.

3. I have not been able to prove any cases directly referable to the pavements.

4. Yes; except in business portions.

5. Not clearly. There are so many other circumstances that proof is difficult.

6. I know of none.

7. I have seen none.

There is a strong probability that wooden pavements and sidewalks, so extensively used in our city, are injurious to health; though it may be difficult or impossible to prove such a statement. I have seen a number of cases of sickness from houses being placed too near the ground, and from yards being full so as to leave quite a hollow place under the house.

Fyfe Lake, Mich.—REPORTED BY H. T. CALKINS, M. D.

Last fall, while I was living at Fyfe Lake, there were four cases of dysentery occurring near sawmill yard, filled in with slabs on border of lake and into the lake to some distance and on low ground further removed, but in course of prevailing winds, which, as there were no other cases in the town, I attributed to the local condition. The case nearest the yard was on high ground.

Grand Haven, Mich.—REPORTED BY J. B. MC NETT, M. D.

The sidewalks in the city are all constructed of pine lumber. The streets are all covered with sawdust and the refuse from our shingle-mills. From constant decay, our sidewalks have to be frequently repaired or replaced with new ones. Our streets are annually renewed with sawdust, as the old soon decays. Our city is one of the healthiest in the State, perhaps so from its location. The city of Grand Haven is situated on the east shore of Lake Michigan, and at the mouth of Grand River. The river is on the north of the town; there is a wide margin of bayou between the city and river; there several mills are located where acres of land are made and covered with tenement houses for the workmen and their families. This is where we have more malarial fever than anywhere else. The cause is more from bad water than sawdust; their wells are shallow, where a hole is made through the decayed sawdust and a few barrels are put down to prevent its caving in. The water drawn rom these holes is bad and causes malarial diseases. The soil of the city is pure and. Our water is good, drawn from drive-wells penetrating the earth to below the surface of the lake. Our prevailing winds are from the lake, sweeping over pure fresh water and clean sandhills. We have a fair share of pectoral and catarrhal diseases during the Winter. During the malarial season, should the prevailing wind be from the north, sweeping over the river and bayou for a few days, we become a little shaky. This has been an open Winter,—our streets bare, exposing immense quantities of decaying lumber and sawdust. We have no epidemics. Typhus and typhoid fevers are comparative strangers here. We have had a few cases of diphtheria of a mild type this Winter. There is no disease of which I can trace the cause to sawdust or decaying pine lumber. Is there not some redeeming quality in the pine?

COMMUNICATION FROM ARTHUR HAZLEWOOD, M. D., OF GRAND RAPIDS, MICH.

DEAR DOCTOR:—When I received your circulars concerning "wood pavements," it occurred to me that, in 1867, when a resident of Memphis, Tenn., many miles of Nicholson pavement blocks were laid in that city. Thereupon I wrote to my friend and former associate, Dr. S. J. Quinby, who had been in the active practice of medicine in that city for over twelve years, for particulars concerning the influence of such pavements. Yesterday I received the enclosed. It is very satisfactory to me, as it clearly demonstrates that neither wooden pavements, nor any other kind now in common use, have any special influence *per se*, but only so far as they compel or incite to ordinary cleanliness in thoroughfares.

STATEMENT BY DR. S. J. QUINBY, OF MEMPHIS, TENN.

Wooden pavements have been tested in Menphis under almost every possible circumstance which could in any way affect public health. It is now nearly eleven years since their introduction into the city, and they extend about ten miles. Last year, owing to decay and wear from heavy traffic, they were removed from the entire length of Main street on one side and stone was substituted. The other side was repaired with new blocks of wood. The same is true of Madison street, which is the main thoroughfare to the Charleston depot. This change was effected during the heat of mid-summer, and while it was being carried out the old decayed wood lay piled along the sidewalks for five or six weeks. The paved streets which abound in the best class of dwellings are Shelby and Adams. The former is rather flat and poorly drained. The drainage of the latter is perfect. A portion of the pavement along the former is so tender from decay that it can be easily pulled to pieces by hand. It is so uneven and full of holes that transit with any class of vehicle is difficult. Along the entire length of the latter for nearly two miles, it is in a much better condition but rough and uneven. Portions of the pavement have from time to time been taken up and relaid for the purpose of putting down and repairing gas and water pipes, through all of the streets.

Previously to the introduction of the pavements, the entire city was in any thing but a favorable sanitary condition. This was in a great measure owing to the almost universal habit of depositing the refuse of dwellings and stores into the public streets. The first three years following the completion of the pavement, the entire city enjoyed remarkable immunity from the usual malarial affections. Latterly it has not maintained this advantage, yet it has never since been as sickly as previously to the year 1866. Within the past ten years there have appeared a few cases of a marked typhoid nature, but mostly mild in degree. The older physicians here say that the same type of disease prevailed at times several years since. Families residing upon the paved streets have always been as healthy as those remote from these. Taking into account the short winters, warm, damp springs, and long hot summers, the wood has been subjected to a severe test. Notwithstanding all of this, I have never been able to detect any disease arising from its use. The pavement has given the city better health on account of enforced sanitary regulations, and I can see that it has had no other influence than this upon disease one way or the other. Poorly drained Shelby street has been as healthy as perfectly drained Adams.

Greenville, Mich.—REPORTED BY O. E. HERRICK, M. D.

6.* Yes. In the north-east portion of our city, many of the streets are covered with sawdust to the depth of two feet, and many lots in that portion of the town are more or less covered over. The river in the spring of the year always overflows its banks, and as all the mills located on its banks throw their sawdust into the water, large quantities are deposited upon the north bank of the river each spring. The north bank being the lowest and the channel of the river being on that side, the sawdust is carried over to the low lands upon its north-east shore. Then, besides the cause I have mentioned, 3 or 4 mills cart large quantities out on the streets for the purpose of making better roads to approach the mills. As for its influence on the health of the people I have no doubt about the matter. For the last three or four years, 75 per cent of all the cases of malarial diseases in our city have been over on that side, and not one-quarter of our inhabitants live there. I have also noticed that a large majority of our cases of cholera infantum have occurred among the people living on those sawdust bottoms. You ask for my "reasons for assigning to them such a cause." The only reasons I can give are the facts mentioned above, that malarial diseases, cholera infantum, and diarrheas are much more prevalent during the warm months of the year in that locality than in any other in our city.

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* The figures beginning paragraphs refer to questions in the circular on page 43 of this Report.

Hillsdale, Mich.—REPORTED BY J. W. FALLEY, M. D.

There are no wooden paved streets in our city, and our wooden sidewalks are not allowed to decay. That an old, decaying pavement, always damp on the under side, and with *such a smell*, should be a cause of sickness, I have no more doubt, than that any other decaying vegetable may be.

Jacksonville, Fla.—REPORTED BY A. S. BALDWIN, M. D., *Member Board of Health.*

We have no paved streets of wood. We have numerous plank sidewalks, but have never remarked any results from their use prejudicial to health. We have also several streets covered with sawdust, and have had for many years past, but no sickness has resulted; and our local medical society has unanimously given it as an opinion that sawdust on the streets, as it has been used here, is not injurious to health. Our lumber used for sidewalks is southern yellow pine, containing much turpentine, and the sawdust from the same contains turpentine.

We also have what is called made-land on the margin of some of our creeks that are marshy, made of slabs laid in piles and layers and covered and filled in the interstices with sawdust and sand. We, as a Board of Health, have discouraged such constructions and forbidden them in the future, unless they are at all times below water so as to be constantly covered; in such case no decay seems to take place, as those which for years have been thus covered are, when taken up, free from decay. But I have known pine saplings that for years had been buried under water, to undergo decomposition and fall into powder in a very short time after becoming dry in the air.

March 17, 1878.

St. Clair, Mich.—REPORTED BY A. L. PADFIELD, M. D.

6.* Parts of streets are so made and places are so filled in.

7. I have always thought that these localities were more subject to attacks of malarious fevers. There are portions of this city occupied by groves of trees of large size, and several dwellings are located in said groves. I have found that malarial fever is more frequent here than in any other part of the city, and more frequent as to number of cases in Spring and Fall than in Summer or Winter. I have attributed said state of facts to moisture longer retained in consequence of the growth of trees, circulation of air and free access of sun's rays not being permitted to take place to the same extent as in open districts; and to decaying fallen foliage, limbs of trees, and the like.

Three Rivers, Mich.—REPORTED BY C. W. BACKUS, M. D.

5.* I have not noticed any. Most of our wood-walks are old and decaying. Many have been renewed in the past three or four years, and our village has been very healthy for the past five or six years; but the same healthy condition prevailed in those parts of the village where there have been no wood-walks.

Thornville, Mich.—REPORTED BY JOHN S. CAULKINS, M. D.

4.* Some of the streets have wood sidewalks.

5. No cases of sickness can be fairly attributable to them, for they are yet undecayed.

6. Sawdust, pine bark, and slabs have been used to some extent. In the neighborhood of the sawmills, which are numerous in the county, their refuse is very much used for making roads.

7. I am not in possession of any facts relative to the influence on the public health of such decaying wood in roads, nor am I aware that observations on that point

have been made to any great extent. If the study of the relation of decaying wood to disease depended upon observations made on roads covered with chips, slabs, or sawdust, it is to be feared that the subject would always remain in obscurity, owing to the necessarily divided nature of their influence, which must be principally exerted on the travellers over such roads. Although I am unacquainted with any observations relative to the unsanitary effect of wood decaying in roads, yet I can answer your question in a general way, and say that I am, and have been for the last five years, suspicious that the decay of carbonaceous matter partially exposed to the atmosphere, might be productive of disease. This suspicion attaches in a less degree to wooden sidewalks and wood-covered roads, than it does to neglected woodhouses and chipyards. The particular disease with which I have suspected that decaying wood might have complicity, is cerebro-spinal meningitis, and the suspicion was aroused during the prevalence of our last epidemic of that dreaded disease, by the coincidence of cases in houses, and the proximity of large quantities, the accumulations for 10 or 12 years, of decaying refuse wood and bark. Of course it is understood that these cases may be coincidences merely, and the writer does not wish to be understood as expressing any belief to the contrary; he only means to affirm that the coincidences were sufficiently striking to cause a suspicion (which would prompt to further investigation) that there might be a causal relation of the decaying wood to the disease. If the question should be raised *how* decaying wood can produce disease, we must frankly admit our ignorance; we know but little of the abstruse chemistry of decay; but when we reflect on the nature of some of its known processes, we can scarcely avoid the conviction that unknown dangers may lurk there. Not only might deadly gaseous poisons be produced by fermentation, but we may believe that carbonic oxide may be produced by an eremacaustic process, a slow oxidation in the interior of the decaying substances, where the supply of oxygen is limited, a condition necessary for the production of this poison.

In conclusion it might be remarked that although the theory that decaying wood causes disease is by no means demonstrated, the probability that it may be true is quite sufficient to prompt every man to think that he and his family will be quite as safe if he keeps his woodhouse or chipyard clean.

From all these replies it will be seen that no well authenticated facts have been observed respecting the causal relation of decaying wood on the surface of the ground, and any of the zymotic diseases. I have no doubt but that cases of such diseases have occurred in the practice of very many physicians of long experience and observation, justly and naturally attributable to decaying wood in damp, unventilated cellars. The impression is very general, too, that the same process of decay of wood or other vegetable material in the open air gives origin to the same noxious gases, and may cause the same or similar diseases. The very obvious reason why we do not readily trace cases of sickness to such causes is that the gases from decomposition are not confined and concentrated, but are either at once absorbed by the best and most efficient disinfectant, the earth, or are diffused in the air.

Sidewalks should be kept in good repair, and as soon as decay has fairly begun, they should be renewed. Decay will be best prevented by raising them from the ground so that air can freely come to all parts of them.

I cannot close this report without remarking upon the wisdom and goodness of God, as displayed in this thing: viz., that while constant decay of vast quantities of animal and vegetable material must necessarily be going on, giving origin to gases highly destructive to animal life, the generous earth is ever ready to take them all up and render them not only harmless, but fitted again to minister to life; or the winds of heaven are ready to scatter the forces of those poisonous gases, and by their very diffusion throughout the atmosphere, to take away from them their power to do harm.

Respectfully submitted,

KALAMAZOO, MICHIGAN. H. O. HITCHCOCK.

REPORT OF PROCEEDINGS

OF THE

AMERICAN SOCIAL SCIENCE ASSOCIATION,

At its Annual Meeting at Cincinnati, O., May, 1878.

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BY

PROF. R. C. KEDZIE, M. D.,

PRESIDENT OF THE

MICHIGAN STATE BOARD OF HEALTH.

PUBLIC HEALTH SUBJECTS

AT THE MEETING OF THE AMERICAN SOCIAL SCIENCE ASSOCIATION IN CINCINNATI.

At the last meeting of the State Board of Health I was requested to attend the meeting of the American Social Science Association, and I report that I have obeyed the resolution and attended the meeting till near its close. I endeavored to keep the members of this Board well informed in regard to the proceedings of the Association and of the papers read in the meetings, by sending to each member the daily papers containing the fullest account of the transactions. One object in sending some member of the Board to attend such meetings is to obtain fuller information on any and all subjects which relate to the work of this Board than will be contained in the reports for newspapers made by persons who are not especially interested in subjects which command our immediate attention. I therefore present a report of matter of peculiar interest and value to the State Board of Health.

I did not reach the city in time to attend the first meeting, but sent the reports as printed in the daily papers.

The sermon of Bishop Jagger was printed in full, and no abstract of it is required. It was an able discourse and commanded close attention.

The annual report of Secretary Sanborn was listened to with close attention by all who were able to hear at all; but when we consider that he has a voice of little penetration, was reading in a long hall that had no carpets or matting to deaden the sound, that Dexter Hall is as resonant as a drum, and that the big organ was droning all the day in the same building, you can well see that you were fortunate in not *hearing* this report, but in having a good printed copy of the same. It was unfortunate that the big organ and the new Music Hall were the pride and joy of Cincinnatians, and no public affair could be duly celebrated except at the new Music Hall. This was about a mile and a half from the principal hotels, and was every way unfitted for such meetings. After some two days and nights of torture at the Music Hall, the Association met at Cincinnati College, a very comfortable and convenient building directly across the street from the Gibson House, which was the headquarters of those attending the Social Science Association.

One marked peculiarity in regard to the papers read at the Association was the marked preponderance of papers on the money question. I leave all these papers with no further notice than the newspaper reports already furnished.

In the paper of Dr. J. A. Warder on "Forestry in its Economic Sanitary and Hygienic Relations," I hoped to gather some information of value to this Board, but I found nothing new except the assumption that the Eucalyptus

Globulus and trees of this class averted the malarial tendencies by absorbing and assimilating immense quantities of water from the swamps, rather than by any balsamic exudations or emanations. He raised the question whether the cottonwood and white willow would not be as efficacious, as antimalarial as the Eucalypti.

The discussion which followed this paper took the economic and pecuniary view, and nothing of value to us was brought out. I was greatly disappointed both in the paper and discussion. It was a re-hash and echo of old truths so far as truth and fact were adhered to. Geo. P. Marsh's "Man and Nature" made up the body of the paper, and the presentation of the facts was in no sense improved from the natural and easy style of Marsh. The essential relations of forest growth and public health were overlooked in a masterly style!

The paper of Dr. Bartholow on "The Relation of Sewer Gas to the Production of Specific Diseases" was one that interested all present, and was one of great interest to this Board.

After speaking of the unfortunate complication of the question of sewers and sewer gas with local politics, and the division of opinions originating from party bias instead of scientific convictions, Dr. Bartholow said:

> "The power of sewer gas to cause specific diseases is also a popular belief, which has percolated down from the highest sources, and it has its origin in the first facts connecting fecal accumulation and typhoid fever. There are yet medical sanitarians of good repute who still maintain this doctrine, and it has large following and undoubting acceptance among the pseudo-scientific. I may here so far anticipate my conclusions as to say that we now know that no amount of fecal accumulation can cause typhoid, unless, indeed, its germ be present. Furthermore, the progress of research has shown, or, at least, has rendered it highly probable, that each specific disease is correlative to its own germ."

He then proceeds at some length to show that every specific fever is caused by a specific germ, and closes this part of his discussion by quoting with approval the dictum of Burdon-Sanderson. "Every contagium consists ultimately of particles not soluble in water."

He then proceeds to speak of the composition of sewer gas, that it contains compounds of sulphur, carbon, phosphorus, hydrogen, sulphide of hydrogen, disulphide of hydrogen, sulphide of carbon, carbonous oxide, carbonic oxide, phosphuretted hydrogen, ammonia, various fat acids and their compounds, and numerous other gaseous and volatile substances.

After speaking of the remarkable immunity of Parisian scavengers from the poisonous influence of sewer gas, he proceeds to point out the two kinds of poisoning which may ensue from breathing sewer gas: (1.) When breathed at once in large quantity, producing syncope and death by convulsions from acute blood poisoning; (2.) When breathed in small quantity for a long time, producing chronic blood poisoning, giving a marked case in illustration.

After speaking of the conservative influence of the law of gaseous diffusion, he closed with the following, which is the gist of his long essay:

> "You will next ask me this important question: Admitting that sewer gas produces, when present in sufficient quantities, toxæmia or poisoning only, and not specific diseases, may it not be a carrier of materies morbi or disease germs? This is the form which the popular apprehension now takes. If germs exist in our atmosphere which, lighting on a suitable soil, begin a process of growth and development, can not sewer gas be equally a vehicle for the diffusion of germs? When illustrious

personages fall victims to vulgar and common-place diseases, the supernatural or the extraordinary is invoked to account for such an untoward event. Thus, when the Prince of Wales fell ill with typhoid fever, the gases from the sewers and drains of his palace were supposed to have conveyed it into the royal person. While I do not deny the possibility of germs being so conveyed, it must be evident in the very nature of things that such an event is improbable. It must be remembered that those are liquid matters conveyed into and contained in sewers. The physical properties of germs being such as I described, they can hardly be taken up with the gaseous matters, the products of decomposition. It is true that liquids containing disease germs may be dried, pulverized, and driven hither and thither by the winds; but such a process can hardly take place in a sewer."

Now if it is true that specific diseases are only caused by specific germs, and if these solid germs can only be sustained in the air by being sustained like dry dust, and can never rise in the air in a moist condition or from a moist surface; that the bubbles of gas bursting on the surface of a putrefying mass of fecal matter cannot carry such germs into the air; that liquids containing disease germs must be dried, pulverized, and driven hither and thither by the winds, a process which can hardly take place in a sewer,—if only under such circumstances can disease germs be carried through the air, then indeed is sewer gas driven into close quarters as a cause of specific diseases, such as typhoid fever, diphtheria, etc., and the "pseudo-scientific" who believe that sewer gas may cause such diseases, should hide their heads in a sewer!

I was very anxious to have these topics discussed; but after waiting for a time and seeing that no one was disposed to open the subject, I took the floor, saying that I came to acquire and not to impart information on this important subject, since I lived in the country where sewer gas was unknown. But to set the ball rolling I would very cheerfully confess my own ignorance in order to draw out the valuable information held by others here present.

The germ theory of disease is now quite generally accepted by scientific persons, not as a demonstrated fact in all cases, but as a very plausible theory. Analogy is very strongly favorable to the theory: in the purest air under natural conditions the germs of fermentation are always floating, and when these fall into a material fitted to sustain and develop these germs, we find them developing and producing all the phenomena of fermentation. Is it not possible that the germs of typhoid fever, of diphtheria, etc., may, in like manner, float always in the atmosphere, only demanding a proper nidus for their development,—that nidus being furnished by a diseased or deranged body, and this the consequence of sewer gas? How shall we explain the fact that diphtheria and sewer gas have walked hand in hand through Pittsburg this very year, the disease being directly as the exposure to this gas, as is clearly shown by Dr. Snively?

But if disease germs can only be carried about as dry and pulverized dust, how can we explain the spread of the contagium of small-pox, measles, scarlet fever, diphtheria, etc., where the contagium appears to be given off from *moist surfaces* without any process of "drying and pulverizing," or even the energetic action of the wind carrying the germs "hither and thither"?

Dr. Bartholow briefly replied that in epidemics of such diseases he supposed the germs of these diseases floated everywhere in the atmosphere, and these germs falling upon weakened, diseased, or predisposed bodies, the germs developed and the person was attacked by the disease. Sewer gas may thus act as a *predisposing* rather than an *exciting* cause. This closed the discussion on this branch of the topic.

Col. Anderson, City Engineer, then took the floor and spoke in a very clear and satisfactory manner of the principles involved in proper construction of city sewers. The old method was to make large sewers of porous material, viz., brick; the inside of such sewers were rough and produced a large amount of friction, retarding the flow of all materials in the sewer; from its large size, also, the sewer allowed a large amount of sewage material to accumulate in the sewer, often a small channel only in the middle of a large deposit of semi-solid material permitted a rivulet of fluid material to pass. In such a sewer, where the sewage remained for a long time, a large quantity of sewer gas was necessarily formed, as the conditions of moisture and temperature in the sewer favored such fermentation. *Now* the sewers are made small, of vitrified or hard-burned sewer-pipe; and in such a sewer no gas has time to form, for it does not remain an hour in the sewer before it is discharged. With proper open-air ventilation, no sewer gas can form in such sewer to endanger the health of any one.

Assistant Engineer Hobbie spoke on the same subject. He said that he often spent many hours a day in the city sewers and he considered the air in the sewers better than much of the air in the streets and alleys of Cincinnati; that he and his men were exceptionally free from disease.

Let me say that if any one from this discussion jumps to the conclusion that sewer gas is especially desirable for purposes of respiration, or that immunity from typhoid fever and diphtheria can be secured with absolute certainty by living in a sewer, he goes beyond the deductions which sound logic would draw from these premises!

There was a very interesting discussion in the Section of State Charities on the construction of hospitals and asylums, in which the tendency to secure the erection of vast, complicated, and palatial buildings, both for hospitals and asylums, was pointedly condemned. In the case of asylums for the insane this was very emphatic, it being shown that the best condition for the restoration of the insane was the cottage plan, where some approximation to family life could be secured, which afforded the best conditions for restoration of the mental health.

The suggestion of Dr. Allen that there was more need of effort for *prophylaxis* than cure of insanity, was one that will bear thoughtful consideration.

I regret that so many of the papers and so much of the discussion related to questions of finance and politics, and that public health occupied a subordinate position.

R. C. KEDZIE.

REPORT ON PUBLIC HEALTH SUBJECTS

IN THE PROCEEDINGS OF THE

MICHIGAN STATE MEDICAL SOCIETY,

AT ITS ANNUAL MEETING AT LANSING, MAY 15 AND 16, 1878.

BY

HENRY B. BAKER, M. D.,

MEMBER OF THE MICHIGAN

STATE BOARD OF HEALTH.

REPORT ON PUBLIC HEALTH SUBJECTS

IN THE PROCEEDINGS OF THE MICHIGAN STATE MEDICAL SOCIETY, AT ITS ANNUAL MEETING, MAY 15 AND 16, 1878.

In compliance with the request of this Board, I respectfully submit the following account of such proceedings of the State Medical Society, at its last annual meeting, as pertain to subjects more or less closely related to the public health and to the work of this Board.

In his address of welcome, Dr. George E. Ranney, of Lansing, said:

> "It is a pleasure to welcome accomplished and faithful physicians and surgeons, who, while worthy to stand guard over the sacred citadel that enshrines a fellow-being's life, are instructing the people in the means of avoiding the enemies of health and longevity, and who, like true physicians, rise above the mere practitioner and become benefactors, by elevating mankind to an appreciation of scientific knowledge and rational medicine."

Speaking of the work of the society, he said:

> "Its committees have gone into school-rooms, work-shops, and prisons, and borne testimony against crowded rooms, fetid atmosphere, and other unsanitary conditions. They have insisted that in all God's universe there is no *elixir vitæ* but His own free air, and have declared in the name of science that drugs and lotions are not antidotes to poisonous gases, sewage, and contagion when taken into the system.
>
> "The State Board of Health, composed principally of medical men and worthy examples of their calling, aided in their work by the profession throughout the State and largely by members of this Society, are rendering invaluable service to the people of Michigan, without reward, excepting the priceless compensation to members of a liberal profession, of duties nobly done."

SMALL-POX AT DEARBORN.

On the first day, Dr. S. P. Duffield read an interesting paper on an outbreak of small-pox at Dearborn, giving a history of his efforts by vaccination, etc. to prevent the spread of the disease, and stating many interesting facts concerning the details of the outbreak. One point of especial interest was the conveying of the disease by a person who, after visiting cases of small-pox, had changed all his clothing, washed his body, and had ridden six miles through a heavy snow storm,—the Doctor's belief being that the contagium of the disease had been carried in the hair and beard. He called attention to this case as indicating a necessity for greater care on the part of physicians and others who visit cases of small-pox, that the contagium of the disease shall not be carried in the hair and beard.

THE CAUSATION OF NASAL CATARRH.

As the study of the causes of diseases is so frequently preliminary to their prevention, it may be appropriate to notice a paper by Dr. E. L. Shurley, of Detroit, on the causation of chronic nasal catarrh, in which he points out the fact that nasal catarrh is in some cases what upon the skin is recognized as an herpetic or eczematous eruption. The tendency of this evidence is toward the separation and classification of the various diseased conditions of the mucous membrane, now called catarrh, and it may lead to some useful results in the way of prevention.

DANGER TO LIFE FROM UNRESTRAINED INSANE PEOPLE.

Dr. J. H. Beech, of Coldwater, presented resolutions, and spoke on the subject of danger to the public from persons slightly insane allowed to be at liberty. He mentioned several cases in support of his view that the public were exceedingly obtuse to this particular danger, and needed warning of the same. One of the resolutions which he offered called upon the State Board of Health to warn the public of danger in such cases. Remarks on the subject were made and additional cases mentioned, by Dr. S. S. French, of Battle Creek, Dr. Hamilton, of Tecumseh, and others, and the resolutions were adopted, as follows:

"*Resolved*, That the frequent occurrence of homicide, infanticide, and suicide, by persons who had previously exhibited more or less evidence of mental aberration, calls for more stringent regulations in regard to the care of such persons, and protection of themselves and the unwary from their irresponsible acts.

"*Resolved*, That the medical profession, as individuals, coming more frequently than other citizens to early knowledge of mental wanderings, are morally responsible for every neglect to give warning of danger, and should in no case allow the pride or influence of friends to prevent timely public admonition and control.

"*Resolved*, That whilst it is of great importance that the laws protect every rational human being in his freedom, liberty, and rights, untrammeled by the caprice, avarice, or misjudgment of others, it is equally important that the law should *not* be clothed with terrors of prosecutions for errors committed without malice or foul-craft, to a degree which may deter conscientious men from duty in regard to the care of persons of doubtful sanity.

"*Resolved*, That this society respectfully call the attention of THE MICHIGAN STATE BOARD OF HEALTH to this subject, and do recommend that it warn the public of the frequent danger of retaining partially insane friends at their homes, and give to the public clear views of the hope of recovery by early treatment in proper institutions."

THE PUBLIC HEALTH ENDANGERED BY IGNORANT DOCTORS.

The danger to the public health because of confidence in quacks and impostors who assume to have knowledge of medicine and surgery, or of the treatment of persons suffering from certain diseases, came in for a small share of attention by the society. A resolution adopted and sent in by the Berrien County Medical Society was as follows:

> "*Resolved*, That a law should be enacted by the Legislature of Michigan for the protection of the people against unqualified men engaged in the practice of medicine and surgery; that this be presented to the State Medical Society for their consideration."

The subject was first referred to the executive committee, and afterward to a special committee which is expected to report at the meeting next year. The same subject was treated by Dr. T. N. Reynolds, of Detroit, in a paper entitled "Medical Education of the People Their Best Safeguard," wherein he said:

> "If imposition and quackery is ever removed or lessened at all, it will be in exact proportion to the amount of correct information and thorough enlightment the people may obtain on this entire subject; for it can never avail very much that a few educated and honorable practitioners labor to bring the comparative few whom they reach up to a reasonable and correct estimation of the practice of medicine, while the masses remain unable to discriminate between the imaginary and what is real in it, or between the artful and unscrupulous pretender and the genuine medical man. As long as there is a general and popular demand for the different forms of quackery, there will always be found an ample supply; and legislation, though necessary and good as far as it goes, can never entirely prevent it. The early and continued education of each individual on the subject is the only successful remedy."

It will be seen that his views are in some respects similar to those set forth in a communication to this Board, a year or two ago, by Dr. Chase of Otsego, who advocated the plan of requiring every person who practices medicine or surgery to place on record with a public officer a sworn statement of the essential facts as to term, place, nature, etc., of studies preparatory thereto, the place and time of graduation, opportunities for qualifications, etc., so that the public might have such information in any case, and act accordingly. It seems to me that some such provision for valuable information to the people, on a subject so closely connected with life and death as is this, is extremely desirable, and that legislation in this direction is far better than that in our neighboring state, Illinois, which requires the State Board of Health to guard the interests of public health in this matter by examining such persons as cannot show diplomas from reputable medical colleges, and debarring from the practice of medicine and surgery such as do not pass the required examination. There is undoubtedly among the people quite general inability to distinguish the quack from the educated and skillful physician. That the danger to the public health is real and widespread, there can be no question. The Illinois method of lessening it seems to be to force out of medical and surgical practice those who have not graduated from a reputable medical college, or who do not pass the examination by the State Board. The method proposed in this State is to provide better opportunities for the people to learn the qualifications of those who propose to practice medicine, and then leave the question as to who shall practice to the people themselves. Aside from the labors of this Board in disseminating information, which have indirectly done something in this direction, the legislature in this State has as yet done nothing whatever to lessen the danger.

RELATIVE TO THE WORK OF THIS BOARD.

Near the close of the meeting, Dr. Bartholomew, of Lansing, an ex-president of the society, said:

"I wish to say a word in regard to the State Board of Health, my interest in the State Board of Health, my complete satisfaction with the action of the State Board of Health, and my approval of what they have done. * * * It is only a few years ago that the State Board of Health was established, and before that time there was scarcely a week that we did not see reports of deaths from kerosene. Now, I would ask the members of this society to remember if they have seen any such reports lately. This is one thing that they have given attention to, and I do think that in this one particular the efforts they have put forth to secure to us good kerosene have saved dozens of lives in the State of Michigan. And this is only one thing that they have done. I move that this society tender its thanks to them for the efficient and successful manner in which they have discharged their duty."

Dr. Foster Pratt, of Kalamazoo, the retiring president of the society, said:

"This society has on former occasions expressed its appreciation of the State Board of Health, and even went so far as by a resolution to pledge its members individually to a cordial coöperation with it in all its plans and purposes throughout the State, and to assist it in its labors. But like the vote of thanks to the citizens and ladies of Lansing a while ago, it is undoubtedly a good thing to do it twice, and I therefore support the motion."

The motion was unanimously carried.

PUBLIC HEALTH SUBJECTS, AT THE RECEPTION.

On the first evening of the meeting, the physicians of Lansing entertained the members of the society and their ladies at a reception, where, after the supper, sentiments were offered and responded to by prominent physicians and others in attendance. In responding for the State Medical Society, to a sentiment of appreciation of its long-continued work for humanity, Dr. Foster Pratt, president of the society, said:

"Whatever tends to elevate a profession so important as is ours to the welfare of humanity, necessarily contributes to the benefit of society and of the State. By as much as we elevate our professional and moral power in the relief of sickness and of pain, at the bedside and in the family, by so much do we enhance the interests and the welfare of our patrons; by as much as we increase our knowledge of the causes and the laws of disease and the best methods of preventing its inroads, by as much as we save suffering and pain and preserve the life, the health, and the strength of the people, by so much do we add to the happiness, the usefulness, and the wealth of the race.

"It is enough to say that the medical profession of Michigan, of which this society is the concrete expression, has made to the common stock of knowledge numerous and honorable contributions of original thought and of research, by which not only we but the entire community have learned much and may yet learn much more regarding the hereditary transmission of disease and of diseased tendencies; the local and preventable causes of disease in earth, air, food, and water; the prevention and mitigation of epidemics and endemics; the care of our children at home and at school; the care of ourselves in business and in recreation; and the promotion of the comfort and health of our homes.

"Such being the fruit, let us assiduously cultivate, guard, and cherish the tree that bears it; and so long as the Michigan State Medical Society thus honorably fulfills its mission, we will all heartily join in the prayer—*esto perpetua*."

Hon. O. M. Barnes, of Lansing, in the course of his response to a sentiment of regard for the legal profession, said:

"The medical profession has done and is doing a work of vast importance to our race. We owe it a debt of gratitude we can never pay. * * * But this profession is to be honored chiefly for what it has done and is doing to prevent and cure disease and prolong life. It is not for me to dilate on this topic; the facts are numerous and apparent to all. A single thought will suffice. How many lives are annually saved by its exertions, how much suffering is alleviated, how much disease prevented, how much added to the average duration of human life! Blessings from hearts grateful for lives saved come up to you from every quarter. What would our condition be without this profession! Civilized man, under the teaching of this profession, is coming to appreciate what it seems to me he ought to have appreciated ages ago, that disease, like everything else in this world, is produced by causes, and that in a multitude of cases, at least, these causes may be understood and thereby the disease avoided. The uncultured are apt to look upon disease as a mysterious, special, causeless visitation of invisible powers. The existence of the rational view among us we owe to the learned profession here assembled. Indeed, we must depend on it for the dissemination of hygienic knowledge. Our own State Board of Health is doing in this respect a most important work, by gathering and disseminating knowledge on sanitary subjects specially interesting to the people of this State.

"In one respect these new views have been making fearful inroads upon the habits of society. Once it was fashionable to dilate on one's ailments. Now, since you have told us about these causes of disease and have assured us that so many are the products of our own neglects or abuses, we are ashamed to say that we are sick. I, for one, would like to retaliate on your profession by so availing myself of this knowledge as to keep always well. Why, sir, it has come to such a pass that one cannot have a little sickness all alone quietly at home without some board of health pointing its finger at some cause. We are almost robbed of the right of charging these things to Providence. I am in favor of straightening up as far as possible and giving you as few occasions as possible for this censure."

The sentiment, "The American Public Health Association, and the relation of the medical profession to public health measures," was responded to by Dr. Azel Ames, Jr., of Massachusetts. I regret that I cannot give a full outline of his genial and vigorous speech, wherein he touched upon some of the many illustrations of the good work done for humanity by the medical profession, and made a strong plea for continued contributions of like character through the association for which he was called to speak, and otherwise.

Respectfully submitted,

HENRY B. BAKER.

THE OPIUM HABIT IN MICHIGAN,

A SPECIAL REPORT PREPARED FOR THE

STATE BOARD OF HEALTH,

AND INCLUDING A SUMMARY OF REPLIES BY 96 PHYSICIANS IN MICHIGAN TO A
CIRCULAR OF INQUIRY RELATIVE TO THE USE OF OPIUM
IN THEIR LOCALITIES.

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BY

ORVILLE MARSHALL, M. D.,

OF NORTH LANSING, MICHIGAN,

A REGULAR CORRESPONDENT OF THE STATE BOARD OF HEALTH.

THE OPIUM HABIT IN MICHIGAN.

Secretary State Board of Health:

DEAR SIR:—At a meeting of the State Board of Health in January, 1877, by a written communication, I called its attention to the large number of opium-eaters in the vicinity of North Lansing, giving many particulars relating to the opium habit as it exists here. In complying with the request of the Board to prepare an article for publication, I have extended the investigation to other parts of the State, the result of which investigation is here given.

From the nature of this habit, complete and perfectly reliable information with regard to it is impossible. Those who have become addicted to the use of the drug resort to almost every possible means which human ingenuity can devise to conceal it. To such an extent are falsehood and deception practiced by the opium-eater, that they seem to be almost a part of the habit itself. Those best acquainted with its extent are the physician and the druggist. As a rule, the physician, although originally responsible for many of the cases in his vicinity, is only aware of them through his business relations with the druggist. The latter, from whom the drug is obtained, from fear of loss of trade, or, as some of them term it, a violation of confidential business, are often unwilling to furnish any information with regard to it. Even under these difficulties, much interesting information relating to the subject has been obtained.

Two hundred circulars were sent to prominent physicians throughout the State asking for information with regard to the opium-habit in their localities. A postal card with printed form for report of the number of male and female opium and morphine eaters in each place was enclosed. To these, ninety-six replies were received giving the number of opium and morphine eaters in ninety-six cities, villages, and townships of the State, with much other information relating to the habit.

From the supposed impossibility of getting reliable information of the numbers in the larger cities, no circulars were sent to Detroit, Grand Rapids, or East Saginaw; and probably from this cause, no answers were received from many of the larger cities of the State where circulars were sent.

In Table I. is given a summary of the numbers reported in the different places, including the city of Lansing. Those who eat opium and morphine are given separately, with their sex, and the number of each. All forms or preparations of the drug used, except morphine, are included in the reports under the head of opium.

The population of the places given is according to the State census of 1874, and in each instance includes the population of the township in which the city or village is situated. In a few cases, the reports include territory outside of the township; as these are not generally given, no mention is made of them here; they are probably offset by other reports which only include those cases personally known to the physician in the places where they are situated.

TABLE I.—*Showing the Number of Opium and Morphine Eaters, with the Number of Each Sex, Reported in 96 Cities, Villages, and Townships of the State, with the Population of Each Place, Including the Township in which it is Situated, according to the State Census of 1874.*

CITY, VILLAGE, OR TOWNSHIP.	COUNTY.	Population, Including Township,—1874.	OPIUM EATERS.			MORPHINE EATERS.			Total Opium and Morphine Eaters.
			Males.	Females.	Total.	Males.	Females.	Total.	
Adrian	Lenawee	10,235	14	25	39	33	44	77	116
Albion	Calhoun	2,614	7	9	16	4	19	23	39
Allegan	Allegan	3,718	2	1	3	1	4	5	8
Alpena	Alpena	3,964	2	4	6	0	1	1	7
Alton	Kent	1,240	0	0	0	0	0	0	0
Baltimore	Barry	1,216	1	1	2	0	0	0	2
Benton Harbor	Berrien	2,525	4	5	9	0	5	5	14
Bingham	Huron	664	0	0	0	0	1	1	1
Blissfield	Lenawee	2,048	4	8	12	1	1	2	14
Brighton	Livingston	1,737	0	2	2	6	6	12	14
Brooklyn	Jackson	1,596	1	2	3	1	5	6	9
Buchanan	Berrien	2,880	0	0	0	3	4	7	7
Burlington	Calhoun	1,524	2	5	7	1	1	2	9
Calumet	Houghton	5,219	0	0	0	0	0	0	0
Cannonsburg	Kent	1,205	1	2	3	0	1	1	4
Cassopolis	Cass	1,814	0	1	1	1	4	5	6
Charlotte	Eaton	3,644	3	4	7	2	5	7	14
Climax	Kalamazoo	1,400	2	1	3	0	4	4	7
Clinton	Lenawee	1,437	1	0	1	0	5	5	6
Coldwater	Branch	5,605	8	9	17	10	10	20	37
Columbiaville	Lapeer	1,308	4	10	14	0	1	1	15
Corunna	Shiawassee	2,353	6	0	6	3	7	10	16
Dayton	Berrien	1,361	0	1	1	1	3	4	5
De Witt	Clinton	1,410	5	5	10	1	2	3	13
Eaton Rapids	Eaton	2,220	1	1	2	6	10	16	18
Elsie	Clinton	1,567	2	1	3	0	2	2	5
Flat Rock	Wayne	2,490	1	2	3	0	1	1	4
Fowlerville	Livingston	2,813	6	6	12	2	4	6	18

TABLE I.—CONTINUED.—*Number of Opium and Morphine Eaters, by Sex, in 96 Localities in Michigan.*

CITY, VILLAGE, OR TOWNSHIP.	COUNTY.	Population, Including Township,—1874.	OPIUM EATERS.			MORPHINE EATERS.			Total Opium and Morphine Eaters.
			Males.	Females.	Total.	Males.	Females.	Total.	
Galesburg	Kalamazoo	1,974	2	2	4	2	8	10	14
Gilead	Branch	762	0	0	0	0	1	1	1
Grass Lake	Jackson	1,757	4	5	9	3	6	9	18
Greenville	Montcalm	3,140	2	3	5	8	10	18	23
Hadley	Lapeer	1,504	0	2	2	0	0	0	2
Hanover	Jackson	1,397	2	1	3	0	1	1	4
Hart	Oceana	1,082	0	2	2	1	0	1	3
Hillsdale	Hillsdale	4,189	10	8	18	11	9	20	38
Holly	Oakland	2,507	4	5	9	4	10	14	23
Homer	Calhoun	1,772	4	0	4	0	5	5	9
Howell	Livingston	2,813	7	8	15	3	7	10	25
Hubbardston	Ionia	1,803	2	3	5	0	1	1	6
Hudson	Lenawee	3,927	6	10	16	6	10	16	32
Huron	Huron	437	2	1	3	0	0	0	3
Ionia	Ionia	4,747	4	2	6	4	8	12	18
Laingsburg	Shiawassee	1,312	1	3	4	0	2	2	6
Lansing	Ingham	8,316	25	24	49	18	24	42	91
Lapeer	Lapeer	4,038	4	6	10	2	7	9	19
Leroy	Ingham	1,205	1	3	4	0	0	0	4
Little Prairie Ronde	Cass	1,445	2	1	3	1	2	3	6
Lowell	Kent	2,826	3	8	11	4	3	7	18
Manchester	Washtenaw	2,509	2	3	5	4	5	9	14
Maple Rapids	Clinton	1,513	2	1	3	0	5	5	8
Marshall	Calhoun	5,576	8	22	30	9	10	19	49
Mattawan	Van Buren	2,209	2	3	5	0	1	1	6
Mendon	St. Joseph	1,748	0	0	0	0	4	4	4
Milford	Oakland	2,069	0	2	2	0	0	0	2
Monroe	Monroe	6,709	0	0	0	0	1	1	1
Muir	Ionia	2,843	1	0	1	0	8	8	9
Napoleon	Jackson	1,120	1	0	1	0	2	2	3
Niles	Berrien	6,387	17	13	30	4	12	16	46
North Adams	Hillsdale	2,857	5	4	9	16	3	19	28
Orion	Oakland	1,186	2	2	4	0	0	0	4
Ortonville	Oakland	1,170	4	3	7	1	2	3	10
Otisville	Genesee	1,365	3	1	4	0	1	1	5
Otsego	Allegan	2,118	5	8	13	6	12	18	31
Ovid	Clinton	2,533	2	6	8	1	7	8	16

TABLE I.—CONTINUED.—*Number of Opium and Morphine Eaters, by Sex, in 96 Localities in Michigan.*

CITY, VILLAGE, OR TOWNSHIP.	COUNTY.	Population, Including Township,—1874.	OPIUM EATERS.			MORPHINE EATERS.			Total Opium and Morphine Eaters.
			Males.	Females.	Total.	Males.	Females.	Total.	
Owosso	Shiawassee	3,498	2	4	6	3	6	9	15
Oxford	Oakland	1,342	1	3	4	1	2	3	7
Palo	Ionia	1,324	0	0	0	1	1	2	2
Peck	Sanilac	1,185	0	0	0	0	0	0	0
Petersburg	Monroe	1,648	1	1	2	0	1	1	3
Petoskey	Emmet	315	4	1	5	0	1	1	6
Pinkney	Livingston	1,213	0	3	3	0	3	3	6
Plymouth	Wayne	3,009	1	1	2	0	3	3	5
Pontiac	Oakland	4,672	6	7	13	3	12	15	28
Portland	Ionia	2,506	5	9	14	9	17	26	40
Prairieville	Barry	1,168	0	0	0	0	4	4	4
Richland	Kalamazoo	1,255	0	1	1	0	0	0	1
Rockford	Kent	2,591	3	4	7	0	1	1	8
Shelby	Oceana	799	0	0	0	0	1	1	1
South Cass	Ionia	1,037	1	4	5	0	0	0	5
St. Charles	Saginaw	1,341	1	5	6	0	2	2	8
St. Joseph	St. Joseph	3,288	5	5	10	9	10	19	28
Stockbridge	Ingham	872	1	0	1	1	2	3	4
Stoneville	Marquette	1,098	0	0	0	0	0	0	0
Tecumseh	Lenawee	2,543	5	7	12	4	9	13	25
Thornville	Lapeer	1,668	0	0	0	2	3	5	5
Unadilla	Livingston	1,066	0	0	0	2	2	4	4
Union City	Branch	2,250	3	4	7	2	3	5	12
Utica	Macomb	1,581	3	4	7	2	3	5	12
Vernon	Shiawassee	1,785	1	2	3	4	6	10	13
Wacousta	Clinton	1,298	2	2	4	0	1	1	6
Walled Lake	Oakland	1,276	2	2	4	0	0	0	4
Wayne	Wayne	3,127	7	5	12	4	6	10	22
Whitehall	Muskegon	1,323	3	6	9	3	6	9	18
Williamston	Ingham	1,405	1	5	6	1	6	7	13
Wyandotte	Wayne	3,338	1	0	1	0	0	0	1
Totals		225,633	275	355	630	235	448	683	1,313

In those places giving the largest proportional numbers, the information was generally obtained of the druggists * by the physician making the report;

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* If there were two or more drug stores in the same place, a list of the names of opium-eaters was obtained at each. A comparison of the lists showed whether the same name appeared more than once; in case a name was found on more than one list it was counted but once. Where

most of the other reports include only those persons with whom the physician was personally acquainted. This is noticeable in the reports from the two neighboring cities of Adrian and Monroe, the first giving the large number of 116, which was obtained after considerable effort by particular request; from the latter city, but one case was reported, and this was given to show its history. A gentleman formerly in the drug business at Monroe estimates the number of opium-eaters in that city at not less than sixty. With few exceptions, the minimum number only is given; the whole number is probably greater in many instances. But four physicians report that they were aware of no cases in their localities. Two of these were in the Upper Peninsula, and theirs were the only reports received from that part of the State. The habit seems to be pretty general throughout the State, with the possible exception of the mining regions of the Upper Peninsula.

In this State, the drug is used principally in three forms: *First,* Crude or gum opium; *Second,* Sulphate of morphia, called morphine; *Third,* Tincture of opium, called laudanum. Opium is the concrete juice of the poppy (*Papaver Somniferum*). Morphine is one of the active principles of opium and is used in preference to it by many, because of its smaller bulk, its certainty and rapidity of action, and because of its use not being accompanied by some of the unpleasant effects of the crude drug. Laudanum is the alcoholic solution of opium, made by macerating opium in diluted alcohol. It is used by opium-eaters when the additional effect of alcohol is desired. In a few instances, McMunn's Elixir is used, which is an extract of opium, about the strength of laudanum. Opium inebriates do not confine themselves entirely to one form of the drug. Opium-eaters become morphine-eaters, and *vice versa.* Not infrequently alcohol, chloral, and chloroform are added by the advanced opium-eater.

The total number of opium-eaters reported in the places given is 1,313; of these 803 are females, and 510 are males. In Table I., under the head of opium-eaters are classed only those who use opium and preparations of opium other than morphine. The number of these reported is 630,—females 355, males 275. The total number reported as using morphine is 683,—females 448, males 235, there being more female than male opium and morphine eaters.

The population of the cities and villages mentioned in Table I., including the townships in which they are situated, according to the State census of 1874, was 225,633. The population of the whole State at the same time was 1,334,031. If the number of opium-eaters, including morphine-eaters, in proportion to the population in the places given holds good for the entire State, the total number of opium-eaters, of all classes, in the State would be 7,763. Taking every degree of the habit into consideration, this estimate of the number is probably not too large.

Opium is principally produced in India, Turkey, and Egypt. The supply for the United States comes mostly from Turkey.* Considerable quantities of a poor article are said to be produced in some of the New England States, California, and Arizona, which is sent to Philadelphia where the morphine is extracted.†

The amount of opium and morphine imported into the United States each year for the past twenty-seven years, with the cost of the same, is given in

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druggists refused to give information the statistics are imperfect, the numbers being less as a consequence. A number of replies were received where estimates were made. Such estimated numbers are not included in Table I. O. M.

*U. S. Dispensatory.

†Report of Massachusetts State Board of Health, 1872.

the following table, prepared by E. Young, chief of the Bureau of Statistics, Treasury Department, Washington, D. C. In addition to the amounts given in the table, it is estimated that not less than ten per cent of that amount is smuggled into the country.

TABLE II.—*Statement of Imports into the United States of Opium and Morphine during the Fiscal Years 1850 to 1877, inclusive.*

FISCAL YEARS ENDED JUNE 30.	OPIUM.		MORPHINE AND SALTS OF.	
	Pounds.	Dollars.	Ounces.	Dollars.
1850	130,349	362,605	....	....
1851	40,885	94,815	....	....
1852	42,123	126,695	....	....
1853	131,870	346,643	....	....
1854	108,178	270,627	....	....
1855	111,229	407,683	....	....
1856	157,814	485,846	....	....
1857	131,154	463,452	....	....
1858	135,915	447,534	....	....
1859	71,839	304,910	....	....
1860	119,525	540,543	....	....
1861	109,536	427,793	12	35
1862	194,844	651,181	1,137	2,677
1863	62,618	266,553	175	604
....	....	* 200,872	....	....
1864	113,699	653,158	71	171
1865	142,708	668,039	172	421
1866	192,196	705,799	2,098	4,230
1867	185,856	857,047	941	2,255
....	....	† 40,022	....	....
1868	216,447	1,010,650	62	‡ 135
1869	157,182	1,086,572	1,485	‡ 9,192
1870	254,609	1,776,908	3,188	‡ 15,613
1871	315,121	1,926,915	237	‡ 1,066
1872	416,864	2,107,341	240	‡ 701
1873	319,134	1,978,502	589	‡ 1,702
1874	395,909	2,540,228	1,309	‡ 4,349
1875	305,136	2,037,793	4,252	‡ 13,102
1876	388,311	1,805,906	3,285	‡ 9,097
1877	349,223	1,788,347	3,403	‡ 8,083
Total §	5,299,774	26,472,979	22,656	73,433

* Opium prepared for smoking.
† Extract of opium.
‡ Home consumption.

§ This line has been added to the table as given by Mr. Young.

The whole amount imported for 27 years was 5,299,774 pounds of opium and 22,656 ounces of morphine, at a total cost of $26,472,979. Taking the average as given in the table for the three years 1875–6–7, the amount imported into this country each year would be 347,557 pounds of opium, and 3,447 ounces of morphine. Allowing that an ounce of morphine is equal to a pound of opium, the amount of opium imported would be 351,204 pounds, at a cost of $1,887,443. The average for the three years 1850–1–2 is 71,119 pounds of opium, at a cost each year of $195,372. This shows an average increase in quantity in twenty-seven years of 493 per cent. The increase of population in the same time was only 78.6 per cent. Allowing that the yearly increase since 1870 was the same as it was for the twenty years from 1850 to 1870,* the population of the whole country would be 46,342,711 in 1877.

The average amount of opium consumed by each opium-eater in this State, as reported, is about one ounce avoirdupois per week. A druggist in a small village in Lapeer county writes that he sells on an average one pound of opium per week to fifteen regular customers. Allowing that three pounds of opium per year is the average amount consumed by each opium-eater, it would give 117,068 as the number of opium-eaters in the United States. It is estimated by writers on this subject that one-fifth of the whole amount imported will supply all legitimate uses of opium in medicine; deducting that amount from the average given for the year 1877, and dividing as before, it would give 93,654 opium-eaters in the United States. An able writer in an article in the New York Times,† after making reductions for smoking opium, and allowing one-fourth as the amount used in legitimate medicine, estimates the number of opium-eaters in the United states at 82,696. At this estimate, the proportional number of opium-eaters for Michigan would be about 2,550, which is less than one-third the estimated number based on the reports of physicians. I am informed by a gentleman connected with one of the leading wholesale drug houses in Detroit that the sales of sulphate of morphia by his house average two hundred ounces per week, a large share of which is used in this State. As this house is only one of a large number of the sources of supply, it furnishes some idea of the extent of the habit among us.

The large number of "Antidotes for the opium-habit" advertised indicates something of the extent of the vice. These are preparations of opium or morphine in disguise, and are sold by unprincipled scoundrels at an enormous profit. Analyses of these "antidotes," made by Prof. A. B. Prescott of our State University, and by others,‡ prove them in every instance to contain opium or morphine.

Opium is used in medicine to relieve pain, produce sleep, quiet nervous and spasmodic action, and in some cases to check over-secretion. No other remedy has done as much to relieve the sufferings of the human family. When not diverted from its proper use it is well worthy the name which has been given to one of its preparations, *Laudanum* (to praise, or praised). When its use is long continued, the system becomes accustomed to it, and larger doses are tolerated and required to produce the desired effect; the attempt to leave it off is then followed by depression and suffering so severe that few have the courage or endurance to discontinue its use. By the opium-eater,

> "The drug is resorted to on account of the pleasurable sensations which result from it. The mental faculties are said to be enlarged; a state of mind is felt which

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*Johnson's Cyclopedia.

†The Opium Habit's Power, New York Times, Dec. 30, 1877.

‡Peninsular Medical Journal, 1874-6.

> is described as perfect happiness; the ordinary capacities of enjoyment are refined and amplified. Dreams and hallucinations of a wondrous but agreeable kind present themselves to the thinker—but there is no intoxication like that produced by alcohol. To his friends, the opium-eater may seem a grave, silent, and abstracted person, or his flow of conversation and expression of his ideas to others may be more remarkable and more vivid than theirs. At length he sleeps, still dreaming; sleeps long; and when awoke, still feels drowsy. Now his head aches, his frame is unusually weary, his tongue is coated, his appetite is gone, his eyes are dull and listless; he longs to sleep again. Soon there comes a depression and misery of mind which is described as intense. To cure this, the wretched man knows but one way. Death would be better than its continuance. He takes opium again, and so he goes on, till the daily stimulant must be added to, to produce its usual effects. From one grain of opium, or twenty drops of laudanum, to one drachm of opium, or ounces of laudanum, he goes on—along a terrible and slippery incline which in this world has no end. It produces, it is said, a disinclination to all business, and yet, while its influence lasts, a singular ability and aptitude for employment, mental or physical. * * * * * * Opium-eating, once contracted as a habit, is far more difficult to shake off than the practice of alcoholic intoxication. The torments of a drunkard deprived of his accustomed stimulus, described so graphically by Charles Lamb, are as nothing to the sufferings of the devotee of opium, when striving to release himself. 'His sufferings,' says Openheim, 'when deprived of the stimulant, are as dreadful as his bliss is complete when he has taken it. Night brings the torments of hell; day, the bliss of paradise.' 'Effects,' says Coleridge, 'were produced, which acted on me as if by terror and cowardice of pain and sudden death.' And the English opium-eater compares his sufferings, when attempting to break off the vice, an attempt in which at last he succeeded, to the tortures of the rack.
>
> "By long indulgence in the drug, the frame is weakened and emaciated, the powers of digestion and assimilation are impaired, and the life is shortened."*

The effects of the habit are degrading and demoralizing in the extreme. Those who have become its victims, sooner or later are impoverished and broken down in mind and body. Their sallow complexion, sunken eyes, and debilitated appearance are not to be mistaken by the experienced observer.

The demands of the appetite are such that nearly every personal comfort is given up, to satisfy and furnish the means to supply it. Neglect of business results, and poverty is the consequence. One correspondent who reports many opium-eaters in his vicinity says: "I do not know a person who uses morphine (opium) whose family is not neglected and degraded thereby." The correspondent at Wayne reports five opium-eaters in the Wayne county poorhouse, although he does not state how they obtain a supply of the drug.

Those who have become addicted to opium, generally give as an excuse for acquiring the habit, that it was taken in the beginning for some painful or incurable disease. The diseases for which opium was first taken, as reported, were neuralgia, rheumatism, chronic diarrhœa, asthma, bronchitis, consumption, palsy, fractures, and diseases peculiar to women.

The opium-habit in this country seems to arise from many different causes, prominent among which is the indiscriminate use of medicines without intelligent medical advice. Few families are to be found who are without their stock of remedies. Common among these, are opium, morphine, Dover's powder, laudanum, and paregoric, besides the domestic prescriptions containing opium.

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* Headland on the Action of Medicine, Fourth American Edition, page 430.

For the nursery, in addition to the common opiate preparations, are the patent soothing-syrups, cordials, and anodynes, nearly all containing opium.

To show to what an extent the dosing of infants with opiates is carried, it is claimed that over three-quarters of a million of bottles of Mrs. Winslow's soothing-syrup are sold annually in the United States. According to an analysis made and reported in the California Medical Gazette, each bottle of this syrup contains from one-half a grain to one grain of morphine. Placing the average at three-quarters of a grain to each bottle, the amount of morphine used in this manner would be 562,500 grains, or about 1,171 Troy ounces,—enough to kill a half million of infants not accustomed to its use.

The effect of the frequent administration of opiates to infants is most disastrous, and is probably the cause of thousands of deaths every year as the result of its interference with digestion, assimilation, and its over-stimulation of the nervous system. Hydrocephalus, meningitis, convulsions, cholera infantum, diarrhœa, dysentery, rickets, and marasmus often follow the continued use of opiates in infancy, as a consequence.

From the predisposition to nervous and neuralgic affections produced by it, probably many cases of the opium-habit in the adult have their first cause in the use of opiates in infancy and childhood. A want is created in the child which is satisfied in the adult when opium is taken, tolerance being already established.

Referring to this subject, Condie, in his Diseases of Children, says:

> "Very young children are often peculiarly sensible to the poisonous action of opium, so that it is scarcely possible to give them the most insignificant dose with safety. When the use of opiates is once commenced, there is a strong inducement to again and again resort to them, until the necessity for their almost constant employment, and for the gradual augmentation of the dose in which they are given, is fully established. The frequent administration of opiates to infants never fails very speedily to destroy the powers of the stomach, to retard the growth and development of the body, and to induce a general condition of the system altogether adverse to the healthful discharge of its functions."

Prostitution and drunkenness are given in the reports as causes of the opium-habit. The first is mostly confined to the larger cities. The prostitute, broken in health and exhausted by disease and debauchery, is a willing victim to a new vice. These remarks apply with nearly equal force to licentiousness in the male.

It is claimed that many reformed drunkards become opium-eaters, and that the agitation of the temperance question and the passing of prohibitory liquor laws have been means of increasing the opium-habit. Probably the truth of this matter is, that those who substitute opium for alcohol when reforming from the vice of drunkenness had previously dabbled with opium.

The most frequent cause of the opium-habit in females is the taking of opiates to relieve painful menstruation and diseases of the female organs of generation. The frequency of these diseases in part accounts for the excess of female opium-eaters over males.

Undoubtedly in many instances physicians are directly responsible for the habit, in continuing the medicine too long, or too frequently resorting to it; but more often the opiate is prescribed and afterward indefinitely continued without the physician's knowledge or consent. The prescription intended for a day is repeated by the druggist many times, and its use is continued until the habit is formed. I believe there is no effectual law to reach these cases or prevent the sale of opium in any quantity. At present it would not be difficult for a lunatic or a child to obtain at the drug stores all the opium he called for, provided he told a plausible story and had the money to pay for it.

The habit is sometimes formed by physicians' using morphine hypodermically and instructing patients in the use of the hypodermic syringe. Three such cases are reported by correspondents in this State, the amounts of morphine used being eight to ten grains per day. It is claimed by Dr. S. F. McFarland, in an article published in the New York State Medical Society's Transactions for 1877, that this form of administration is more liable to be followed by the habit than when opium is taken in any other way; and he cautions physicians against its indiscriminate use. He says, "I have seen every available portion of the patient's body and limbs covered with abscesses, with positive evidences of septicemia, compelling him to return to its use by the stomach, as there was not a place left to insert the point of the syringe."

Instances are given in the replies by physicians of large quantities of the drug consumed by opium-eaters. A man at Petoskey is reported as using two ounces of opium per day. Cases are given of morphine-eaters who use daily a drachm of morphine. The average amount of morphine for a morphine-eater in this State is about one and one-half drachms per week. Instances are reported of morphine-eaters who frequently take thirty grains at a dose. A female in the southern part of the State has taken daily a single dose of twenty grains of morphine, for the past eighteen years.

The age of the oldest opium-eater given was eighty-six years; another was eighty years old, and many were past seventy. A case is reported of a female of twenty who commenced the use of morphine at fourteen. In the past year I attended a child seven years of age, in its last sickness, who had taken morphine from its birth, administered by its mother, who was a morphine-eater. The child refusing to take it longer, died after three days' illness, suffering all that any old opium-eater would when deprived of his accustomed stimulus.

One correspondent reports four deaths out of twelve opium-eaters in the past year. Another correspondent gives the particulars of four suicides of opium-eaters in one family within a few years. Suicide where opium or one of its preparations is the agent employed to destroy life is very common, a fact which is familiar to those who read the daily papers.

From the careless manner in which opium is kept in houses, it is not to be wondered at that accidental deaths from over-doses of opium taken by mistake are of common occurrence. The following table shows the number of deaths from these causes, reported to the Secretary of State for the years 1870 to 1875, inclusive:

TABLE III.—*Number of Deaths reported from Laudanum, Morphine, and Opium in Michigan, during each of the Years 1870–1875, as compiled in the Vital Statistics Department from the Returns of Deaths to the Secretary of State.*

CAUSES OF DEATH.	TOTALS, 1870–1875.	YEARS.					
		1875.	1874.	1873.	1872.	1871.	1870.
Totals by years	33	11	6	7	7	1	1
Laudanum	[a] 3	[a] 2	[a] 1				
Morphine	[b] 19	4	[b] 4	4	5	1	1
Opium	11	5	1	3	2		

[a] Suicide. [b] Includes one suicide.

The table gives only those reported, the actual number is undoubtedly much greater. Many cases of sudden death produced by over-doses of opium are ignorantly or intentionally reported as having died from apoplexy, paralysis, brain disease, convulsions, heart disease, and other causes. A much larger number of accidents occur from this cause, but are recovered from.

View the subject in whatever light we may, the evidence shows that the consumption of opium in this country is enormous and out of all proportion to its necessity in disease.

When we consider the fact that the amount of opium imported into the United States annually is greater than the amount China received from abroad a hundred years ago, there is reason to be alarmed at the progress of the habit among us.

With no more rapid increase in the habit than this country is now making, it takes nearly four thousand tons of opium, in addition to the home production, to supply China with her millions of opium eaters and smokers.* In an enlightened country like ours, there is little excuse to be found for the existence of the habit; and it would seem that some effort should be made to check its further progress. With a properly educated people, and medical profession, with laws to regulate the sale of opium and nostrums, much could be accomplished to remedy the evil.

O. MARSHALL.

Lansing, October 1, 1878.

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*Opium and the Opium Appetite, page 29,—Calkins.

SPECIAL REPORTS OF THREE OUTBREAKS OF

DIPHTHERIA

IN LOCALITIES IN MICHIGAN,

MADE BY TWO REGULAR CORRESPONDENTS OF THE STATE BOARD OF HEALTH, AND HAVING SPECIAL REFERENCE TO ITS

CAUSATION, COMMUNICATION, AND PERIOD OF INCUBATION;

ALSO,

A DOCUMENT ISSUED BY THE STATE BOARD OF HEALTH

RELATIVE TO THE

RESTRICTION AND PREVENTION OF DIPHTHERIA.

DIPHTHERIA.

THREE OUTBREAKS OF DIPHTHERIA IN LAPEER, OAKLAND, AND CLINTON COUNTIES, MICHIGAN; ALSO A DOCUMENT ISSUED BY THE STATE BOARD OF HEALTH RELATIVE TO THE RESTRICTION AND PREVENTION OF DIPHTHERIA.

In the last Report, were published replies by 38 regular correspondents of the Board to a letter of inquiry as to the causation and communication of diphtheria, 2 special reports, relative to the same points, by health officers of townships, 2 reports of special investigations of outbreaks of the disease, made at the request of the Board by correspondents, and 9 special reports of cases in localities in the State, besides the compilation of weekly reports relative to the disease, and statements concerning it in the replies by 49 correspondents relative to the prevailing diseases in 1876.

In these replies and reports there are two lines of evidence concerning the causation of diphtheria. Some of the evidence tends to the belief that among the elements in the causation or aggravation of the disease, are unsanitary conditions of cellars, privies, wells, or other surroundings of dwellings, and the location of dwellings on damp ground or near cesspools, privies, or swamps, etc. Indeed the evidence of the frequent occurrence of diphtheria under such conditions, and of its aggravation by those conditions, is so strong as to make it a matter of common prudence that every householder and officer of health should assiduously guard against the occurrence of any of these conditions, and should earnestly work for their removal wherever and whenever they may chance to be present. Some, however, are inclined to believe that at present every case of diphtheria is derived from a previous case—through some source of contagion, known or unknown.

Concerning the contagiousness of diphtheria, the weight of evidence in these communications is strongly in favor of the belief that the disease is contagious. So many are the localities from which is reported the apparent communication of the disease by personal contact or association, by a single visit, or by mere association with a person who had been engaged in the care of one sick with diphtheria, and so strong is the probability, in many cases, of such exposure being the only possible source of the disease, that neglect to give warning of the disease, and failure to isolate those sick with it and to debar from association with others, especially in schools and other public assemblies, those who have care of persons sick with diphtheria or who associate with them, on the part of parents, householders, physicians, health officers, teachers, or others in any way intrusted with the care of the public health, would seem to be nothing less than an offense against the public welfare. This offense is greatly aggravated by the fact that "malignant cases may result from exposure to a mild case."

The following communications on the subject of diphtheria, received since the preparation but before the general distribution of the document issued by this Board, are published, as further evidence that diphtheria is a contagious disease, and as an additional warning against preventable exposure to the disease and against living in or permitting others to live in those unsanitary conditions which so frequently attend its outbreak and which are so often present in severe cases. It is worthy of notice that, in view of recent experience in an epidemic of diphtheria, Dr. Topping reverses a statement made in April, 1877, in reply to the above-mentioned letter of inquiry, which was: "I have never seen any evidence of contagiousness in my cases." He has now seen such evidence, and believes that, under some circumstances, it is "as contagious as is scarlatina." Dr. Caulkins' communications are in part a study with reference to the period of incubation. In both, the evidence of contagiousness of diphtheria, if not irresistible, has such great probability that it cannot be disregarded, except in the most reckless spirit. The communications are as follows:

COMMUNICATION FROM JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH., CONCERNING EIGHT CASES OF DIPHTHERIA, FOUR OF WHICH WERE FATAL, IN ONE FAMILY, IN ARCADIA TOWNSHIP, LAPEER COUNTY.

Secretary State Board of Health:

DEAR SIR:—Leave is requested to report to your Board the following notes of eight cases of diphtheria in one family, four of which were fatal.

This malignant outbreak of the disease occurred in the township of Arcadia, Lapeer county, Mich., in November, 1877, and was limited to the family of Patrick McGraw, and some relatives visiting at the house.

McGraw himself, in consequence of the loss of his property, had become discouraged and had left his family, consisting of his wife and five children, in destitute circumstances, who, after their desertion, moved from Lapeer to Arcadia, where the woman had an unmarried brother named Casey. After a delay of three weeks to get rid of former tenants, the woman with her children moved on to Casey's place, to keep his house, which, especially the cellar, having been left in a very dirty condition, it was the first business of the family to clean from top to bottom. Just after the house was cleaned and before the sickness broke out, a sister of Mrs. McGraw and Casey came on a visit, bringing a nephew's wife and sister, making a family in all of ten.

In reporting these cases, the same schedule of questions is used that was employed in studying the outbreak of diphtheria at Rochester last Summer, and which is as follows:

CONCERNING THE LOCALITY.

1. Was the locality in a village, or in the country?
2. What was the nature of soil,—clay or sand?
3. Was the locality wet or dry? high or low? bleak or sheltered?

CONCERNING THE HOUSE.

1. Is the house new or old?
2. What is its distance from other houses?

3. What is the exposure of the house?
4. How is the living-room lighted?
5. What is the exposure of the living-room?
6. How long has the family lived in the house?
7. Is any previous history of diphtheria connected with it?
8. Is the cellar under the living-room?
9. Does it open into the living-room?
10. What was the condition of the cellar,—clean or dirty? wet, damp, or dry?
11. Have vegetables been allowed to go to decay in it?
12. How often is it cleaned?
13. What disinfectants have been used, and to what extent?
14. What fuel is used, and where is it kept?
15. How near is the wood-house or wood-yard to the living-room?
16. How often is it cleaned?
17. Does it contain several years' collection of old rotten chips?

CONCERNING THE WATER-SUPPLY.

1. What was the source of the drinking-water,—well, spring, or cistern?
2. What was the character of the drinking-water,—good or bad in taste or smell? clear or roily?
3. What was the depth of the well and of the water in it?
4. How was the water drawn, with pump or bucket?
5. Was there a tub in the bottom of the well?
6. Was the platform sound or rotten?
7. Was the well properly secured around the top from surface drainage?
8. What was the source of the wash-water?

CONCERNING THE PRIVY.

1. How was the privy constructed?
2. How cared for,—cleaned or moved?
3. How many times moved?
4. How near is it to the well?

CONCERNING THE SICK,—FIRST CASE.

1. What was the name and age of the person sick?
2. What was the date of the attack?
3. Was this the first attack of diphtheria?
4. If not, how long since the first?
5. What was the first symptom?
6. What were the principal symptoms?
7. What was the duration of the disease?
8. What was the termination?

CONCERNING CONTAGION.

1. Is there reason to suspect that the disease had a contagious source?
2. If so, what was its origin?
3. Is there reason to believe that the disease was communicated to others by the sick?
4. How many of the family escaped from any attack of the disease?

CONCERNING ADDITIONAL CASES.

1. How many were the additional cases?
2. How many were fatal?

Also concerning each additional case, the same questions as are printed above concerning the first case.

Concerning the McGraw family, the answers to these questions are as follows:

Locality.—Country; soil, sandy; situation, high but broken with swamps.

House.—Built 6 years; 50 rods from other houses; exposure, south; living-room, lighted with 3 windows,—exposure, south; family had lived in it 3 weeks; 3 years before there was sore throat of mild character in the house. Cellar, not stoned, and with no outside door or window, opens into the pantry, quite dry, not very dirty now, but bad smelling,—previously to the sickness it was very dirty; no information was obtained as to its being cleaned or disinfected, the former occupants being gone; since the sickness, some lime has been scattered on the floor of the cellar; some had been so applied on the day of my visit; there is no probability that anything of the kind had been used previously to the sickness, or that the cellar had been cleaned. Fuel, wood, kept in yard 3 rods from living-room; yard seldom cleaned, how often was not ascertained, contained a large collection of rotten chips.

Water-supply.—Water obtained from a well; clear, good in taste and smell; well 20 feet deep; water within 5 feet of top; water drawn with a tin pail and a pole; neither tub nor curbing in the well; platform good; well secured from surface drainage.

Privy.—Over a pit; not cleaned since built, never moved; 5 rods from well, with down grade from well.

Persons Sick.—(*Case 1.*) Bridget McGraw, aged 10 years; attacked November, 1877; first attack. Principal symptoms, chill and fever, sore throat, croup. Duration of disease, a week; termination, recovery.

Concerning Contagion.—The mother does not know whether the disease had a contagious origin in this first case. The child took sick at school. There were cases of a mild character in the neighborhood, and one fatal case occurred subsequently. There is reason to think that the disease was communicated to others of the family. Casey, the uncle, aged 50, and a visiting sister aged 45, escaped without a symptom. There is nothing to show that the disease spread from the house.

Additional Cases.—(*Cases 2 to 8.*) There were 7 additional cases in this family:—

Daniel, aged 8 years; attacked Nov. 19, 1877; symptoms, chill, fever, sore throat, croup; disease ran 7 days and terminated in death.

Ann, aged 5 years; attacked Nov. 21, 1877; symptoms, like those of the others; disease ran 8 days and terminated in death.

John, aged 13 years; attacked Dec. 7, 1877; symptoms, like those of the others; disease ran 9 days and terminated in death.

Mary, aged 15 years; attacked Nov. 29, 1877; symptoms, like those of the others; disease ran 8 days and terminated in death.

Bridget, mother of the children, aged 42 years; symptoms, like those of the rest; disease ran 6 days, woman recovered.

Clara Simmons, a cousin's wife, and Ann Simmons, sister-in-law to Clara, had the disease lightly.

All the fatal cases were able to be up till the last day of their life. Mary had the membrane in the nose. Bridget (the child), Daniel, and Ann had it on the red of the lips. Though all were croupy, none choked to death; all died from the blood-poisoning; all had severe scattering or wandering pains.

The investigation shows nothing very wrong about the premises, except the cellar, which could not well be worse, it being, as is shown above, a mere hole in the ground, having no ventilation whatever and no communication with the external air, except through the trap-door into the pantry, and being, as Mrs. McGraw describes it, *very* dirty. It probably contained the accumulations and decay of several years' occupancy, the presumption being strong that it was never cleaned since it was dug.

There is but little probability that the McGraws carried the seeds of the disease with them from Lapeer, no case of it having occurred in the neighborhood from which they moved, for several years and none since. The much greater probability is that the disease was caught after the removal, since there was around Attica (distance 2½ miles) and Imlay City (distance 4 miles) diphtheria of mild type, with a subsequent fatal case at the latter village.

Shall we believe that the filthy cellar was the habitat of the diphtheritic poison that carried off so quickly these four strong and healthy Irish children? This is the simplest theory; but, if it is the true one, the outgoing family could hardly have escaped an attack of the disease, as we know that they did. It is more in accordance with the facts in the case to suppose that the first child attacked caught the disease at school and the others from it, and that the emanations from the accumulated filth in the cellar acted,—either by furnishing pabulum to the germs of the disease, or by neutralizing some substance in the blood inhibitory to their growth,—as predisposing or auxiliary agents to prepare the systems of those that breathed them to fall an easier prey to the diphtheritic attack.

Respectfully,

Thornville, Lapeer Co., May 14, 1878. JOHN S. CAULKINS.

COMMUNICATION FROM JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH., CONCERNING AN OUTBREAK OF DIPHTHERIA, IN CLARKSTON, OAKLAND CO., MICH., IN WHICH SIX DEATHS AND NINE CASES OCCURRED IN ONE FAMILY.

Secretary of the State Board of Health:

DEAR SIR:—In pursuance of the plan of collecting a mass of observations and statistics on the subject of diphtheria, for future study, permission is requested to report to your Board the following notes of nine cases of the disease in one family, six of which were fatal.

About the first of July, one of the physicians who had been in attendance (the venerable Dr. Burdick, of Oxford, Oakland county) called my attention to these cases; shortly thereafter I went to the locality, which is nine miles south-west of Oxford and five miles east of Clarkston, and made the observations reported below.

In reporting these cases, the same schedule of questions* is used that was employed in reporting the cases in Arcadia township, Lapeer county.

Name of head of family, Edwin J. Bailey; residence and postoffice address, Clarkston, Oakland county, Mich.

Locality.—Country; soil, sandy; situation, high and dry, much broken with swamps and lakes. There is a marshy ravine just back of the house, to the north, through which a ditch had been opened. Some heavy grading had been done around the house, the dirt being scraped down the ravine.

House.—House old; repaired from top to bottom over the heads of the family, everything being made new outside and inside except the framework; the repairing was just finished when the sickness broke out; 100 rods from other houses; exposure, south. Living-room, lighted by two 15-lighted windows having 8x10 glass; exposure, east. Family had lived in the house seven years before repairing. No previous history of diphtheria connected with it. Cellar, under living-room, opens into hall adjoining living-room; dry, no water gets into it; sides stoned and bottom paved; is cleaned every spring; had not been been cleaned yet, when sickness broke out; has been kept clean and whitewashed since; no disinfectants had been used previously to sickness; no more vegetables had been allowed to decay in it than would naturally decay during the winter. A large quantity of potatoes had been stored there over winter, and had not yet been moved when the sickness began. Two men, not members of the family, who had helped to take out the balance (about a hundred bushels) informed me that they were badly grown, but not rotted any worse than the average for last winter; has one small window and two doors, all closed in the winter, except inside door. Fuel, wood, kept in yard, one rod from living-room; yard cleaned every spring; contained only what had collected during winter.

Water-supply.—Drinking-water from two wells,—one at the house, the other at the barn. The water of the well at the house, which was in use at the time of the sickness, smells and tastes bad; the well at the barn affords better water, and is now mainly used. There was a pitcher of the water from the well at the house on the table at dinner, but I could not drink a swallow of it. The water is clear, and the family are not aware that it is poor. Well 16 feet deep, with 2 feet of water; water drawn with wooden pump, an old one taken from another well; has a box outside of the stoning, no other curbing; platform quite rotten; well secured from surface drainage. Wash-water from a lake.

Privy.—Over a stoned-up vault, blown over by a high wind just before the sickness; moved twice, never cleaned; 7 rods from well.

Persons Sick.—*(Case 1.)* George V. Bailey, 13 years old, attacked May 1, 1878; first attack. First symptom, chill and fever. Principal symptoms, sore throat, headache, fever, and wandering pain. Duration of disease, 16 days; termination, fatal. There was a relapse in this case from quite an improvement on the 4th and 5th days. There was no croup or membrane in the nose.

Concerning Contagion.—The source of the contagion is not known. No information can be obtained showing the previous existence of diphtheria in the vicinity. The boy had been 4 miles away from home 4 days previously; but it is not known that he was exposed to any infection. The disease was communicated to others of the family, and perhaps to neighbors. Hershell Bailey, age near 17, had no symptoms. As to Edwin J. Bailey, the father of the children, the evidence may be considered doubtful. He had a very slight sore throat. His wife inclined to think that it was an attack of what ailed the rest. Mr. Bailey was not at home, and I had no opportunity of talking with him. His age is 45.

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*[Printed on pages 78-79 of this Report.—H. B. B., Sec'y.]

Additional Cases.—There were 8 additional cases, 5 of which were fatal. Their history is given below:—

Arthur Bailey, aged 5 years; attacked May 6, 1878; first attack. First symptom, chill. Principal symptoms, like the first case, not croupy. Duration of disease, 5 days; termination fatal.

Philinda Bailey, aged 2 years 10 months; attacked May 7, 1878; first attack. First symptom not noticed, the child taken sick in the night. Principal symptoms, like the others. In this and one other case the duration of the disease could not be definitely determined; there was a conflict of evidence; Mr. Bailey, who was not at home, had laid away the record. Termination fatal.

Mary Melinda Bailey, aged 7 years 4 months; attacked May 15, 1878; first attack. First symptoms, chill. Principal symptoms, like the others not croupy. Duration of disease, 9 days; termination fatal.

Jeduthan H. Bailey, aged 11 years; attacked May 13, 1878; first attack. Symptoms, like those of the others, but croupy toward the last. Duration of disease, 14 days; termination fatal.

Evelina Bailey, aged 14 years 8 months; attacked May 12, 1878; first attack. Symptoms, like the others not croupy. Duration of disease, 4 weeks; termination, health.

Freddie G. Bailey, aged 9 years 3 months; attacked May 24, 1878; first attack. Symptoms, like the others, but croupy toward the last. Termination fatal.

Baby, not named, aged 4 months; attacked May 15, 1878; first attack. Symptoms like the others, milder, not croupy. Duration of disease, 7 days; termination, health.

Mary Melinda Bailey, mother of the children, aged 35 years; attacked May 18, 1878; first attack. Symptoms, like the rest, not croupy. Duration of disease, 7 days; termination, health.

CONCERNING THE UNUSUAL MORTALITY AT BAILEY'S.

Dr. Burdick attaches great importance to the state of the cellar. He says that it was so charged with carbonic acid gas, as he proved by actual experiment with a lighted candle, that the lower stratum in it would not support combustion. Where a large quantity of carbonic acid is formed by the decay of organic matters, *some* of the far more deleterious carbonic oxide, and probably other unknown and yet more deadly gaseous products, will be formed; and where cellars are so tightly closed to keep out the winter's cold that there is no escape except through the inside cellar door into the rooms above, the effect upon their occupants must be disastrous. A cellar under a house, in which vegetables are to be stored for winter is not desirable, in a sanitary point of view; but many of us have them and are obliged to make the best of them. They should in mild weather be opened every day to the outside air; if not so constructed that this can be done, shallow tubs of water and baskets of freshly burned charcoal set on the bottom of the cellar would be some help toward keeping it sweet.

Dr. Le Baron, a prominent physician of Pontiac, saw the Bailey cases. He is said to attribute their unusual malignancy to the dampness from the newly plastered walls. The writer has in repeated instances seen the coincidence of fatal pneumonia with moving into newly plastered and damp houses.

Another thing that may have had an unwholesome effect on the Bailey family is this: Just across a little lane, say two rods distant from the house in which the family live, south of and facing it, is an empty house in the cellar of which a large quantity of turnips (700 bushels) had been stored. These turnips all rotted and lay there till after the sickness. A man that helped to clear them out told me that it was a filthy piece of work.

CONCERNING THE SPREAD OF THE DISEASE FROM THE BAILEY FAMILY AS A CENTER OF INFECTION.

The number of cases directly infected was six, four women and two men; the women were neighbors who came in to help, and the men were physicians one, an attendant; the other came of an errand. None of these cases was fatal; one was very severe, and one was moderately so; the others were mild. No accurate history of the cases of the women was obtained, but it was learned that they were all young. Their names are below, and those that they infected, as far as learned:

Mrs. Wright, who gave the disease to her four children; Mrs. Elizabeth Row, sister to Mrs. Bailey, infected her three children; Mrs. Stottles; Mrs. Sutherland.

Of the children no case was severe. Henry Smaggs, a neighbor, was the main dependence for help at Bailey's during the entire length of time that the sickness lasted; he only went home, a distance of two miles, to rest and sleep. He did not take the disease himself, but carried the seeds of it to one of his children, who died with it after a brief illness.

Dr. J. C. Goodenough, of Clarkston, was the first medical attendant of the Bailey family. He took the disease and gave it his children, one of whom died. The number of cases in his family, and the further spread of the disease in that direction, were not ascertained.

Dr. Burdick, of Oxford, was the principal medical attendant of the Bailey family during the latter part of the sickness, being first called in the night of the 16th of May, and carried by Bailey in his own conveyance. The next day Dr. Keillor, a partner of Dr. Burdick, drove over to fetch him home. This was the first and only time that he (Keillor) was in Bailey's house. He helped about the sick before he left, and the next day was taken with the disease himself, at 3 P. M., scarcely 24 hours after leaving Bailey's. The description of his case is as follows:

Dr. T. D. Keillor, aged 22; attacked May 18, 1878; first attack. First symptom, chill of great severity, with profuse discharges of saliva from the mouth. Principal symptoms, sore throat, coming on the night following; headache; wandering pains; not croupy; membrane in the nose. Duration of the disease, 15 days; termination, recovery. The disease ran a severe course. At the time of my conversation with him, the fore part of August, he was the mere pallid and trembling wreck of his former vigor.

The only cases that I could trace that he infected are the following:

Jenny Morehouse, aged 16, living with Dr. Burdick, and Libbie Burdick, age 14, the Doctor's daughter. The two girls went together to Keillor's room, at the Commercial Hotel in Oxford, to carry him a bowl of porridge, on the 29th of May.

Jenny Morehouse sickened June 4, 1878; first attack. Symptoms, like Keillor's. Duration of disease, 18 days; termination, recovery. She made a much better convalescence than Keillor did.*

Libbie Burdick took sick two days later with sore throat. She was only slightly sick.

Possibly, a subsequent case was infected from these girls. It was a boy living in the village, 60 rods distant. George Cadogan, aged 10 years; attacked July 13, first attack. First symptom, chill. Principal symptoms, sore throat, croupy. Duration of disease, 10 days; termination, recovery.

This boy was frequently at the Doctor's, and in the sick room, during and after Jenny's sickness.

This, up to the time of enquiry, ended the series of cases in Oxford that derived their infection from the Baileys. There was no time or opportunity to trace the ramifications of the Clarkston branch.

Respectfully submitted.
JOHN S. CAULKINS.

Thornville, Oct. 7, 1878.

In order to facilitate the study of the facts gathered by Dr. Caulkins, and their combination with other facts, the following tabular exhibit and summary have been prepared in this office. A summary of Dr. Topping's cases is given near the close of his letter, on page 85.

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*I have made a memorandum to note, in all future investigations, if shortness of incubatory stage corresponds with malignancy of disease.—J. S. C.

TABULAR EXHIBIT AND SUMMARY *of Certain Facts mentioned by Dr. Caulkins in his Report of the Outbreaks of Diphtheria at Arcadia and at Clarkston, Michigan.*

NAME OF PERSON SICK.	Date of Attack.	Probable Interval from Exposure to Attack,—Days.	Age,—Years.	Sex.	Whether Died or Recovered.	Interval from Attack to Death,—Days.	Probable Origin of the Disease.
Bridget McGraw........	Nov., 1877....	....	10	Female.	Recovered..	....	Contagion.
Daniel McGraw........	Nov. 19, 1877.	....	8	Male ...	Died........	7	Contagion.
Ann McGraw...........	Nov. 21, 1877.	....	5	Female.	Died........	8	Contagion.
John McGraw..........	Dec. 7, 1877..	....	13	Male ...	Died........	9	Contagion.
Mary McGraw..........	Nov. 29, 1877.	....	15	Female.	Died........	8	Contagion.
Mrs. Bridget McGraw..	....	....	42	Female.	Recovered after 6 days.	....	Contagion.
Clara Simmons.........	....	....	....	Female.	Recovered..	....	Contagion.
Ann Simmons..........	....	....	....	Female.	Recovered..	....	Contagion.
George V. Bailey.......	May 1, 1878..	....	13	Male ...	Died........	16	Unknown.
Arthur Bailey..........	May 6, 1878..	....	5	Male ...	Died........	5	Contagion.
Philinda Bailey.........	May 7, 1878..	....	2.8	Female.	Died........	Unknown	Contagion.
Mary Melinda Bailey..	May 15, 1878.	....	7.3	Female.	Died........	9	Contagion.
Jeduthan H. Bailey....	May 13, 1878.	....	11	Male ...	Died........	14	Contagion.
Evelina Bailey..........	May 12, 1878.	....	14.7	Female.	Recovered in 4 weeks.	....	Contagion.
Freddie G. Bailey......	May 24, 1878.	....	9.3	Male ...	Died........	....	Contagion.
Baby Bailey............	May 15, 1878.	....	.3	....	Recovered in 7 days.	....	Contagion.
Mrs. M. Melinda Bailey	May 18, 1878.	....	35	Female.	Recovered in 7 days.	....	Contagion.
a { Mrs. Wright.......*b*	1878....	....	Young..	Female.	Recovered..	....	Contagion.
Mrs. Eliza. Rowe..*c*	1878....	....	Young..	Female.	Recovered .	....	Contagion.
Mrs. Stottles..........	1878....	....	Young..	Female.	Recovered .	....	Contagion.
Mrs. Sutherland....	1878....	....	Young..	Female.	Recovered .	....	Contagion.
—— Smaggs............*d*	1878....	....	Child...	....	Died........	....	Contagion.
a Dr. J. C. Goodenough	1878....	....	....	Male ...	Recovered .	....	Contagion.
—— Goodenough.......*e*	1878....	....	Child...	....	Died........	....	Contagion.
a Dr. Keillor............	May 18, 1878.	1	22	Male ...	Recovered in 15 days.	....	Contagion.
Jenny Morehouse.....*f*	June 4, 1878.	6	16	Female	Recovered in 18 days.	....	Contagion.
Libbie Burdick........*f*	June 6, 1878.	8	14	Female.	Recovered .	....	Contagion.
George Cadogan.......*g*	July 13, 1878.	....	10	Male ...	Recovered in 10 days.	....	Contagion.

a Infected directly from the Bailey family. *b* Infected her 4 children. *c* A sister of Mrs. Bailey; infected her 3 children. *d* His father spent most of the time at Bailey's, going home only to rest and sleep. *e* Child of Dr. Goodenough; other children of the Doctor's family had the disease. *f* Probably derived the disease from Dr. Keillor, though Dr. Burdick may have brought the contagium home. *g* Probably derived the disease from Jenny Morehouse.

Persons sick, 35; males, 9; females, 16; unknown sex, 10; average age of the 19 whose ages are given, 13.3 years.

Died, 12; males, 6; females, 4; unknown sex, 2; average age of the 10 decedents whose ages are given, 8.9 years; the other two decedents were children, age and sex unknown; average age of 6 male decedents, 9.9 years; average age of 4 female decedents, 7.5 years.

Recovered, 23; males, 3; females, 12; unknown sex, 8; average age of two males who recovered, 16 years; average age of 6 females who recovered, 22 years; ages of 15 who recovered, unknown.

Average duration of 8 fatal cases, 9.5 days.

COMMUNICATION FROM G. W. TOPPING, M. D., OF DE WITT, MICH., CONCERNING AN OUTBREAK OF DIPHTHERIA IN THE TOWNSHIPS OF OLIVE, RILEY, AND WATERTOWN, CLINTON COUNTY.

Secretary State Board of Health:

DEAR DOCTOR:—As diphtheria has held a prominent place in my weekly reports of diseases for some time past, I presume you will expect a more connected report of these cases, with such deductions as can be legitimately derived therefrom.

I saw my first case of diphtheria, of the present epidemic, on the 13th day of July last. I had previously heard of two or more cases,—one in D. Knight's family, in Olive; and one in M. Cole's family, in Riley. These two families seem to have been the original source of all the cases, now about 73, which have followed. Nearly every case can be traced to exposure from these two families, or from other cases derived from them.

At first the disease was confined to these two neighborhoods, though the one in Riley spread over a circuit of two or three miles in diameter, and being near the lines of the townships of Olive and Watertown, extended into them; though it did not extend in all from this center farther than above stated.

The cases derived from the Knight family, in the south-east corner of Olive, were confined to about eight families, or eighteen cases, and never extended so as to connect with the invasion of the disease into the township from Riley, on the west. I cannot say that this limitation of the disease in this neighborhood was due to any imposed quarantine or improved hygienic management; but I think there was less social intercourse between the families in this neighborhood than in the one before referred to in Riley, Watertown, and Olive, of which the Simmons school-house may be considered as the center.

The Riley health officers were assured by a physician that diphtheria was not contagious; and their inaction during the early part of the epidemic seems to have been based upon this assumption. Justice to them demands the statement that during the latter part of the epidemic they attempted a tolerably rigid isolation of those affected with diphtheria.

My cases, 44 in all, have presented decided diphtheritic membranes upon the tonsils, fauces, or buccal membrane, and many of the worst ones have been troubled for some time afterward with regurgitation of fluids back through the nostrils, and with other symptoms of partial paralysis of the pharyngeal muscles. Only one of my cases has died during the acute stage of the disease, though two others have remained ill for a long time and finally died of intercurrent diseases.

Four other deaths from diphtheria have occurred in this vicinity within the last 6 weeks, under the care of others, and of which I only know by report. I have learned of about 29 cases of diphtheria under the care of other physicians, and think it quite possible there may have been more.

Of my 44 cases, 3 were 30 years old or more; 41 of them were under 20 years old; 23 were 10 years old, or under; and 8 were 5 years old, or under. The largest number of cases in one family was 7; the next largest number was 5.

In my report to the State Board of Health in April, 1877, I said: "I have never seen any evidence of contagion in my cases of diphtheria." I now think that I have seen very decided evidence of the contagiousness of diphtheria, and I believe that when prevalent in a community it is as contagious as is scarlatina.

There is considerable difficulty in enforcing any efficient measures of prevention; but this will become easier as the public become convinced of its contagiousness, and are willing to coöperate with health officers to prevent its spread.

G. W. TOPPING.

DeWitt, Clinton Co., Mich., Oct. 6, 1878.

Since the publication in the last Report of the communications relative to diphtheria, the State Board of Health has issued a document on the Restriction and Prevention of Diphtheria, designed to put people on their guard against exposure to the disease and against the toleration of unsanitary conditions by which it may be caused or aggravated, and giving specific directions for avoiding or guarding against the communication of the disease in the care of persons sick with it. This document is similar to the one on the Restriction and Prevention of Scarlet Fever. It was prepared, but not generally distributed, before the foregoing communications were received. According to previous custom, it might properly be printed in the first part of this volume; but, in order to bring the different parts of the subject together, it is printed in this connection. It is as follows:

RESTRICTION AND PREVENTION OF DIPHTHERIA.

CAUTIONS AND SUGGESTIONS BY THE MICHIGAN STATE BOARD OF HEALTH.

Because Diphtheria has been and may be expected again to be widely prevalent, and is a formidable and fatal disease, and because it is believed to be a disease very largely preventable, the State Board of Health desires to disseminate as widely as possible among the people of this State, the knowledge of certain facts and principles which seem to be well established, as to the nature and causes of the disease, and the rational means for its restriction and prevention.

NATURE OF THE DISEASE.

Diphtheria is, primarily or secondarily, a constitutional, or blood-poisoning disease. It attacks persons of all classes and ages, but most frequently children under sixteen years of age.

In ordinary cases the poisonous principle of Diphtheria probably enters the blood by way of the mouth and the air passages.

The period of incubation of Diphtheria, or the time from a person's exposure to the disease to his coming down with it, varies somewhat,—being usually from a few hours to seven or eight days; in some cases, it is twelve or fourteen days.

Its most frequent local manifestations are in the mouth, throat, and air passages. When in the mouth or upper part of the throat only, the disease is, as a rule, less dangerous and fatal, but none the less contagious, than when in the air passages, below the fauces.

The specific contagium developed by the disease itself, and by which it spreads, is diffused by the exhalations (breath, perspiration, etc.) of the patient, through the air immediately surrounding him, as well as by clothing or other solid substances that have been brought into contact with the products of the disease.

As a rule, the virulence or malignancy of the contagium is in direct proportion to the severity of the case from which it emanates, though malignant cases may result from exposure to a mild case.

The more this contagium is allowed to accumulate in the room where the patient lies, the more powerful does it become.

RESTRICTION OF DIPHTHERIA.

Diphtheria is a Contagious Disease, and hence the strict observance of the following precautions is of very great importance.

1. Every person known to be sick with this disease should be promptly and effectually isolated from the public;—one or two persons only should take the entire charge of the patient, and they should be restricted in their intercourse with other persons.

2. The room into which one sick with Diphtheria is placed should previously be cleared of all needless clothing, carpets, drapery, and other materials likely to harbor the poison of the disease. This room should constantly receive a liberal supply of fresh air, without currents or drafts directly upon the patient. It will be well also to have the sun shine directly into the room.

3. In order that the guardians of the public health may have early warning, **it is important that every case of Diphtheria be promptly reported to the local board of health.**

4. The duties of Householders, Physicians, and Boards of Health, as specified in sections 1734, 1735, 1732, and 1695 of the Compiled Laws of Michigan, 1871, should be rigidly enforced.† These duties are as follows:

"(1734.) SEC. 43. Whenever any *householder* shall know that any person within his family is taken sick with the small-pox, *or any other disease dangerous to the public health*, he shall immediately *give notice thereof to the Board of Health*, or to the *health officer* of the township [city or village*] in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars."†

"(1735.) SEC. 44. Whenever any *physician* shall know that any person whom he is called to visit is infected with the small-pox, *or any other disease dangerous to the public health*, such physician shall immediately *give notice* thereof to the Board of Health or health officer of the township [city or village*] in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit, for each offense, a sum not less than fifty nor more than one hundred dollars."†

"(1732.) SEC. 41. When the small-pox, *or any other disease dangerous to the public health*, is found to exist in any township, *the board of health shall use all possible care to prevent the spreading of the infection*, and to *give public notice of infected places* to travelers, by such means as in their judgment shall be most effectual for the common safety."

"(1695.) SEC. 4. The said board shall also make such regulations as they may deem necessary for the public health and safety, respecting any *articles which are capable of containing or conveying any infection or contagion or of creating any sickness*, when such articles shall be brought into or conveyed from, their township, or into or from any vessel; and if any person shall violate any such regulation he shall forfeit a sum not exceeding one hundred dollars."

The general laws of this State provide that the mayor and aldermen of cities and the president and council or trustees of villages "shall have and exercise all the powers, and perform all the duties of a board of health as provided in this chapter." This is in chapter 46, sec. (1740) 19, Compiled Laws of 1871, from which chapter all of the foregoing sections are taken. See also, in Laws of Mich., 1873, the general act for the incorporation of cities, chapter 14, sections 1, 7, and 8.

It therefore appears that, except possibly some special charter may exempt a city or village, the foregoing provisions of law are probably applicable and in force in the cities and villages, as well as in all the townships, throughout the State.

5. The discharges from the throat, nose, and mouth are extremely liable to communicate the disease, and should be received on soft rags or pieces of cloth which should immediately be burned.

6. The discharges from the kidneys and bowels are also dangerous, and

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*See Sec. 1740, Compiled Laws of 1871.

†Supervisors must prosecute for all such forfeitures, township officers must give notice to supervisor, prosecuting attorney must conduct suit if requested,—see sections (6852), (6853), and (6855), Compiled Laws of Mich., 1871.

should be passed on old cloths and burned, or into vessels kept thoroughly disinfected by nitrate of lead, chloride of zinc, or sulphate of iron (copperas), and then be *buried* at least 100 feet distant from any well.

Copperas, dissolved in as little hot water as will dissolve it, is a good disinfectant for this purpose.

7. Nurses and attendants should be required to keep themselves and their patient as clean as possible;—their own hands should frequently be washed and disinfected by chlorinated soda.

8. Soiled bed and body linen should at once be placed in boiling water or in water containing chlorinated soda, chlorinated lime, or solution of chloride of zinc.

9. All persons recovering from Diphtheria should be considered dangerous, and therefore no such person should be permitted to associate with others or to attend school, church, or any public assembly, until in the judgment of a careful and intelligent physician he can do so without endangering others.

10. The body of a person who has died of Diphtheria, should as early as practicable be placed in the coffin, with disinfectants, and the coffin should then be tightly closed. Afterwards, the body should not be exposed to view except through glass.

11. No public funeral should be held at a house in which there is a case of Diphtheria, nor in which a death from Diphtheria has recently occurred. No children at least, and it would be better in most cases that few adults, should attend such a funeral.

12. The room in which there has been a case of Diphtheria, whether fatal or not, should, with all its contents, be thoroughly disinfected by exposure for several hours to strong fumes of chlorine gas, or of burning sulphur, and then, if possible, it should for several days, be exposed to currents of fresh air.

To disinfect an ordinary room with chlorine gas: having tightly closed all the openings of the room, place in it an open earthen dish containing four ounces of peroxide of manganese. Pour on this one pound of strong muriatic acid, being careful not to breathe the fumes. When certain that continuous evolution of chlorine is taking place, leave the room and close the door.

To generate Sulphurous Acid gas, put live coals on top of ashes in a metallic pan, and place on the coals sulphur in powder or fragments.

A convenient way is to place the coals and sulphur on a heated stove plate or cover turned bottom upward in a pan half filled with ashes. To disinfect 100 cubic feet of air requires the thorough burning of about one and one-half ounces of sulphur.

13. After a death or recovery from Diphtheria, the clothing, bedding, carpets, mats, and other cloths which have been exposed to the contagium of the disease should either be burned, exposed to superheated steam, to a degree of dry heat equal to 240° F., or be thoroughly boiled.

The foregoing methods of disinfection are applicable in all contagious diseases.

PREVENTIVE MEASURES.

14. Avoid the special contagium of the disease.

15. Beware of crowded assemblies in ill-ventilated rooms.

All influences which depress the vital powers, and vitiate the fluids of the body, tend to promote the development and spread of this disease. Among these influences, perhaps the most common and powerful are, *impure air* and *impure water*. Because of this, and as a means of lessening the

danger of contracting almost all other diseases, the following precautions should always be taken, but more particularly during the prevalence of any such disease as this.

16. The grounds under and around the house should be well drained.

17. No vegetable or animal matter should be allowed to decompose on the surface of the ground near the house.

18. If any soap-factory, slaughter-house, rendering establishment, or other source of foul odors, contaminate the air which you and your children daily breathe, take immediate measures through your local board of health or health officer to have such nuisance abated.

19. Your **own privy** especially, should at all times be thoroughly disinfected, by dry earth, coal ashes, or copperas-water; and the receptacle should be so constructed as to be water-tight and to be tightly covered when removed to be emptied, as it should be often enough to prevent the air about it from becoming offensive, and in cold weather so far as possible.

20. Your whole **house** and especially its sleeping-rooms **should be well ventilated.**

21. Your **cellar should be dry** and well ventilated, it should frequently be whitewashed, and always kept clear of decomposing vegetable or other substances.

22. No cesspool should be allowed near the house. If there be one, it should either be removed or be thoroughly and frequently disinfected with sulphate of iron (copperas).

23. Your **house drains** should be looked to with scrupulous care, to see that they are well trapped, kept clear, and ventilated into the open air.

24. Your house should not have uninterrupted connection with a sewer. Be sure that the waste-pipes do not permit the entrance of sewer gas into the house, but that they enter the sewer through an open-air space, or at least through a space freely ventilated to the open air.

25. Be sure that your **drinking-water** is not contaminated by surface drainage, nor by leakage from the drain, gas-pipes, sewer, cesspool, or vault.

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The foregoing document, planned by Homer O. Hitchcock, M. D., assisted by other members of this Board, is published by the State Board of Health for distribution throughout the State.

In order that the document may do the greatest possible good, it is hoped that each one who receives it will not only make such use of it as will tend to disseminate most widely the suggestions and statements of fact contained therein, but will also *act for the restriction or prevention of this disease* in accordance with its suggestions, or by other effective measures.

Any communication on the subject may be addressed to, OFFICE OF STATE BOARD OF HEALTH, LANSING, MICHIGAN.

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After reading this document carefully, please preserve it for future reference.

[The foregoing document on Diphtheria has been stereotyped by the State Board of Health, and the plates left with W. S. George & Co., printers, Lansing, Michigan, so that local boards of health or others who may wish to distribute the document, can secure copies at a very low rate—for much less than it would cost if the article had to be set up.—H. B. B., Sec.]

THE
PRESERVATION OF THE TEETH:

A PAPER COMMUNICATED TO THE

STATE BOARD OF HEALTH,

—BY—

JAMES H. FARNSWORTH, Jr., D. D. S., of Detroit.

THE TEETH AND THE BEST MEANS FOR THEIR PRESERVATION.

BY JAMES H. FARNSWORTH, JR., D. D. S., DETROIT.

The preservation of the teeth is an aid to the preservation of the health.

In speaking of the care and preservation of the teeth, it is well to begin with the children's teeth, or deciduous teeth as they are called, because the condition, form, and care of these influence, in a large degree, the condition of the permanent teeth. This fact is generally lost sight of by parents, which accounts in some measure for the neglect the temporary teeth receive.

THE DECIDUOUS TEETH.

Most persons believe that the primary teeth are to remain in the mouth only for a short time, and that when they are gone, they will be replaced by another set; and consequently that it is not necessary to fill them when they begin to decay, but to extract them, if anything is done. This is a mistake and a very unfortunate one. A good deal of harm can be done by the premature extraction of the temporary teeth. The primary set are intended to remain in the mouth until the child has attained the age of six or eight years, when the first extraction has to be made to make room for the first permanent tooth. They should not be removed before this time; for when they are extracted too early the growth of the jaw is limited, and it does not develop large enough for the reception of the permanent teeth. The latter are considerably larger than the first set, so that when they begin to appear they come in in an irregular position, all crowding toward the front of the mouth. This has to be corrected at considerable expense. Very few parents of my acquaintance have any idea of a regular period for the eruption of the teeth, or inform themselves on the subject, until its importance is pointed out to them. There is undoubtedly great neglect on the part of dentists to properly instruct their patients on matters of such importance. They should be teachers as well as physicians.

There are frequent variations from the general rule in regard to the eruption of the teeth. The following may be regarded as a very near approximation to the time when the eruption of the *temporary* teeth may be expected: When the child is from five to eight months of age, it receives the central incisors, the lower generally preceding the upper by a short time. At from seven to nine months, the lateral incisors appear. The first molars appear at from twelve to sixteen months; the cuspidati, at from fourteen to twenty months, and the second molars at from twenty to thirty-six months. There are twenty teeth in the temporary set, ten to each jaw.

From the above statement it will be seen that children generally have all their first or deciduous teeth by the time they are three years old. The last of this set should not be lost until the child is twelve or thirteen years old. Accordingly the temporary teeth have a long service to perform, and should be kept in a condition to enable them to do their work properly, which cannot be the case if they are allowed to decay. It is quite as necessary for a child as for a grown person to masticate its food thoroughly, and if it does not, its food is not properly digested and the stomach becomes deranged, which causes a good deal of trouble and sickness.

Children should be made to brush their teeth as often as they wash their faces. They should brush them three or four times a day, using a soft brush and a proper dentifrice, which should contain soap as one of the principal ingredients to neutralize any acidity of the mouth. If a child once contracts the habit of brushing the teeth, it will soon learn to appreciate the benefit to be derived from it, and will not do without it. It is not a burden to cleanse the teeth, and after being judiciously practiced for a while it becomes a very great comfort. As a rule there are very few children whose parents insist upon their brushing their teeth, and about seven children out of every ten have teeth that are blackened and decayed and sometimes covered with tartar, which is caused by a lack of attention to them. The teeth are also injured by allowing children an improper diet, and by giving them large quantities of sugar and candy between meals or just before meals. Every prudent mother should make it a part of her duty to see that her children brush their teeth and take proper care of them. But, let the mother be as careful as she may, there will appear in some instances deposits and stains upon the teeth, which can only be removed by the dentist. Children should be taken to a competent dentist when they arrive at the age of two or three years. He should examine the teeth and see if any are decayed; and if so, they should be filled and properly treated, so that they will last as long as nature intended they should. Nature intended the deciduous teeth to be substitutes for teeth which should be permanent; and until the system is prepared to bring out these permanent teeth, it is our duty to preserve the deciduous teeth as long as they are wanted.

The filling of the primary teeth will appear to some people as an unnecessary expense and trouble, but it is not so expensive and not so much trouble as filling the permanent teeth; and some plastic material is generally the best, for a great many children are so nervous that they will not undergo the long and tedious operation of having their teeth filled with gold, and there are cheaper fillings which, for this purpose, are just as good.

When the permanent teeth begin to develop, the pressure on the temporary teeth causes their roots to be absorbed and they begin to loosen. This loosening of the temporary teeth ought to be the first indication for their extraction; for then their removal is an almost painless operation, and the permanent teeth are ready to take their place.

This care of the children's teeth is the stepping-stone to a beautiful set of teeth in adult life. No matter how ordinary the rest of the features may be, the face is to be admired if the teeth are all white and regular; while on the other hand, there are few things more repulsive than a bad set of teeth and an offensive breath.

THE PERMANENT TEETH.

When a child is six years old it receives the first tooth in the permanent set. This is a very large molar tooth, which comes into the mouth back of all the temporary teeth. It is called the six-year molar. It is generally the largest and strongest tooth in the permanent set, which makes it of great value to the individual. The fact that this tooth comes in so early leads most people to suppose that it is one of the deciduous set; and in consequence it generally receives the neglect a temporary tooth is subject to. It is a very important tooth, and if examined carefully it can be easily distinguished from the primary teeth. So little attention is given to this tooth, that nine out of ten children have lost it by the time they have reached the age of fifteen years.

As before stated, the periods of eruption of the permanent teeth, like those of the temporary, are somewhat variable. In the permanent set. the six-year molar is succeeded by the central incisors, which put in an appearance when the child is about six or eight years of age. This is followed by the lateral incisors, from the seventh to ninth year. These in their turn are followed by the first bicuspids, ninth to tenth year; these, by the second bicuspids, tenth to eleventh year. Of the bicuspid teeth there are four to each set. They belong alone to the permanent teeth, as they do not appear in the temporary set. After these the cuspidati or eye teeth appear from the eleventh to twelfth year, and the second molars from the twelfth to the fourteenth year.

This statement gives the eruption of the permanent teeth, as nearly correct as possible. At this time we have all this set in the mouth except the wisdom teeth, which appear about the twentieth, and sometimes as late as the thirtieth year.

The teeth are susceptible to decay from the first moment they appear in the mouth; in fact some of them appear already decayed, which is caused by the gums overlapping the tooth in the course of eruption, and the food becoming lodged underneath, which is allowed to remain until the tooth is decayed. After a tooth once begins to decay it goes very rapidly, frequently decaying inside until the nerve is affected, before the opening in the enamel is large enough to show the defect. The dentine of the tooth decays much faster than the enamel, because the dentine contains so much animal matter, and is not so dense a structure as the enamel.

People should have their teeth examined by their dentist at least once every six months. By so doing their teeth can be kept in good order with less expense and less pain than if they were neglected for two or three years. It is much easier and cheaper to fill a small cavity than a large one.

Caries of the teeth is a molecular death of the tooth structure, caused by the acids in the mouth, which are generated by the decaying animal and vegetable matter introduced into the mouth as food.

A great many people brush their teeth once a day, generally on rising in the morning, and think that is sufficient for the whole twenty-four hours, but this is not the fact.

The mouth is a very warm place,—nearly 100° Fahr. It is very seldom so warm in the shade in this climate, and yet in the warmest days in summer a piece of meat not kept continually on ice will decay in less than twenty-four hours; why then should not the little particles of food which become lodged between the teeth during mastication decay as soon?

The teeth should be brushed two or three times a day, at the least,—once after each meal, and again just before retiring at night, as the food we have eaten all day should not be left in the mouth through the night. A good quill tooth-pick is quite as essential as a brush; it should be used frequently and thoroughly, particularly after meals. The youth should be instructed to pass a thread of floss silk between the permanent teeth each day; this is of more value than a tooth-pick. It is quite important for every one to know how to brush the teeth properly. I have seen people whose teeth were comparatively clean, but the gums were sore and sensitive to the touch and very much inflamed. These people brush their teeth without brushing their gums. It is quite as necessary to brush the gums as it is to brush the teeth. Become accustomed first to a soft brush; use it lightly and brush up and down the teeth and the gums, and after a while the gums will harden and one can brush them as hard as he does the teeth and without any more inconvenience. The teeth should be brushed inside as well as outside. It is a physiological impossibility for the teeth to decay if kept perfectly clean, except in rare instances, and then owing to constitutional defect.

SALIVARY CALCULUS.

In the care of the teeth they should be kept free from salivary calculus or tartar, as it is called. This is an earthy deposit from the salivary glands and mucous follicles, which supply the mouth with saliva. It consists principally of the phosphate of lime. The composition of the salivary calculus, according to an eminent physician in New York, is as follows:

Phosphate of lime	60 parts.
Carbonate of lime	14 parts.
Animal matter and mucus	16 parts.
Water and loss	10 parts.
	100 parts.

It may be seen by this that it is composed principally of the salts of lime, these being 74 parts out of 100. This deposits on the teeth, sometimes in all parts of the mouth; but it deposits first and in greater abundance on the teeth opposite the openings of the salivary ducts. These are the second molar teeth on the upper set, and the incisors on the lower. It is found on the outside of the superior molars, and the inside of the inferior incisors. It adheres to the teeth with great tenacity, and no amount of brushing will remove it after it becomes once thoroughly attached to the teeth. The dentist is the only one who can remove it successfully. It has to be removed very carefully and with instruments made especially for that purpose; and the surface of the enamel should be polished smooth so as to prevent its immediate deposit again.

All persons are not alike subject to salivary calculus. It collects on the teeth of old people in greater quantity and more rapidly than on the teeth of children, and its chemical and physical characteristics vary in different cases: sometimes its color is black and sometimes almost white. Its density also varies, being at times nearly as hard as the teeth, and again very soft. It sometimes collects in very large quantities, giving to the mouth a most disagreeable and repulsive aspect, and imparting to the breath a very offensive odor. It deposits just around the necks of the teeth next to the gums in greater abundance than on any other part of the teeth, causing the absorption of the alveolar process, the recession of the gums, and the destruction of the periosteum, eventually causing the teeth to loosen and drop out, or else to become such a source of irritation and annoyance that they have to be removed to afford any relief. When the trouble arrives at this stage, this is the only course of treatment, it being impossible for any dentist to restore the gums and alveolar process. It not only causes the recession but also inflammation and suppuration of the gums and alveolar-dental periosteum, making the mouth very sore and sensitive, and giving to the fluids of the mouth a vitiated condition, making them unfit to be taken into the stomach to assist in digestion. Tartar does not produce decay, as is supposed by some; but, according to good authorities, it prevents it.

CARE OF THE TEETH DURING GESTATION AND LACTATION.

It is believed by some, and I think the opinion a general one, that because during the periods of gestation and lactation a system of bones for a new being is in the process of formation, growth, and development, and is deriving every atom of its composition from the blood of the mother, the quantity of bone-making material available for the mother's nourishment is greatly decreased by the demands made upon her system; and that as a natural consequence her osseous system, and especially the teeth, suffer from want of proper nourishment during these periods; and that in this weakened state the teeth fall an easy prey to vitiated secretions of the mouth. This idea is to some extent correct. Although pregnancy should be, and generally is a physiological and not a pathological condition, nevertheless the teeth do sometimes become seriously affected, and it becomes necessary to give them proper care and treatment, and furnish the mother with such food as will enable her to make up for this drain upon her system. Food rich in phosphates and lime salts should be supplied.

Children born of mothers whose teeth have decayed rapidly during gestation invariably have delicate teeth. The causes of these ravages upon the teeth are generally, first, the premature age at which which gestation is commenced; second, the general unfitness of the system, from other causes; and last, mental infelicity acting upon the digestion. Gestation cannot be well sustained until every organ and function of the body has attained full growth and development or maturity.

Notwithstanding that pregnancy is a physiological condition, it changes the condition of the system greatly from that of the unimpregnated state. The patient is generally in a state of nervous and mental irritability and susceptibility, and for this reason a dentist should, in his treatment, be very careful what he does or neglects to do. It is always advisable to postpone until after parturition long and painful operations upon the teeth.

I would not advise the extraction during gestation of a tooth which could be made at all comfortable. Very serious results sometimes occur from the effects of severe operations performed during pregnancy. Among these may be mentioned abortions, malformations, and mental derangements, affecting the mother and child through life.

Persons whose systems show a lack of phosphates and of salts of lime, can use these with great advantage under the direction of a skillful physician. When the fluids of the mouth become abnormal in their condition, the necessary remedies to bring them back to their normal condition can be determined only by testing these fluids. If they are acid in their reaction, an alkaline wash should be used; and if they are alkaline, an acidulated wash should be used.

REPORT

OF

LECTURES ON PUBLIC HEALTH

DELIVERED TO THE

MEDICAL CLASS AT THE UNIVERSITY OF MICHIGAN.

—BY—

HENRY F. LYSTER, A. M., M. D., of Detroit,

MEMBER OF THE MICHIGAN

STATE BOARD OF HEALTH.

REPORT OF LECTURES ON PUBLIC HEALTH.

To the President and Members of the State Board of Health:

GENTLEMEN:—I respectfully report that, since the last meeting of the Board, upon the invitation of the Dean of the Medical Faculty of the University of Michigan, I have given to the medical class a partial course of seven lectures upon public health. The lectures were upon the following named subjects:

History of Sanitary Science,—one lecture;
Public Health: Extent and Scope,—two lectures;
Atmosphere: Diseases Induced by a Vitiated Atmosphere, and Several Methods of Ventilation,—two lectures;
Water: Diseases Induced by Impure Water, etc.,—one lecture;
Drainage and Sewerage,—one lecture.

I enclose a syllabus of the very limited number of lectures which the time allotted the subject permitted me to give.

These lectures were given chiefly with the view of turning the attention of the medical class to the importance of the study of sanitary science in connection with their professional work.

From the interest manifested by the class in the subjects brought before them, I have no doubt but that they have served the purpose for which they were prepared.

I wish in this connection to call the attention of the Board to the necessity for the instruction of those acquiring a liberal education at our colleges, and particularly of those preparing to enter the medical profession, in the department of sanitary science and public hygiene.

Very respectfully yours,
Detroit, July 8, 1878. HENRY F. LYSTER.

SYLLABUS OF LECTURES.

LECTURE I.—*Given April 22, 1878.*

History of Sanitary Science.—Importance of Sanitary Science as compared with other departments of medicine.—Definition of the term.—The science and art of preserving health and preventing disease.—Relations of the medical profession to the people in the future of civilization.—Changes which have taken place in this respect during the past fifteen years.—Examinations of medical men for officers of health.—The influence of the press in instructing the people in public health,—of the medical press,—of the Society of Public Health,—of the American Medical Association,—of the State Board of Health.—City and Township Boards.—Sanitary subdivision of England.—Sanitary subdivision of Michigan.—Urban and Rural Boards.—The gradual development of sanitary science in the 17th and 18th centuries.—The Poor Law Amendment Act, 1834.—The Registration Act, 1835.—The Commission for sanitary investigation of towns, 1847.—Relations between physician and family,—consulted in regard to location and construction of dwellings.—Sanitary science affects all classes of society.—Limitation of contagious diseases.—Effects of cheap transportation on the residence of the working classes.—Investment by cities in improvements and public works which lessen sickness and mortality, profitable in pecuniary point of view, etc., etc.—Necessity for sanitary survey of the State.

LECTURE II.—*Given April 29.*

Public Health—Continued.

Sanitary improvement shown in armies and wars.—Causes of epidemic typhus, and epidemic dysentery.—Removal of typhus and small-pox, and diminution of dysentery.—Improvement of the ration in the army and navy, and in the method of preparing the ration.—Improvement in hospitals, barracks, and camps.—Tent hospitals.—Uses of drains.—Tile draining.—Sewering of cities.—The several factors entering into an epidemic.—Direction of study for those qualifying for officers of health, etc., etc.—The location of dwellings.—The prevention of malarious diseases.—Removal of dampness.—Removal of coldness and sourness of soils.—Prevention of epidemics in cities.—Limitation of contagious diseases.—Schools as a means for the dissemination of children's diseases of a contagious character.—Study of physiology and hygiene in schools.—Special instruction of medical students in analyses, chemical and microscopical.—Methods of heating and ventilating buildings.—Sanitary engineering.—Quantity and quality of water-supply.—Preparation of food for table.—Clothing to meet changes in the seasons, etc., etc.—Sewerage system of cities, villages, and dwellings.—Management of sewage,—Conservancy and riddance.—Water-supply of ancient and modern cities.—Sewerage of same,—Rome, London, Berlin, Paris, Chicago, Pittsburg, New York, Detroit, Buenos Ayres.

LECTURE III.—*Given May 6.*

Air.

Composition.—Office of oxygen and of nitrogen.—Methods of determining excess of carbonic acid.—Where found in excess.—Air as a medium of contagion.—Ozone, composition of, under what circumstances found in excess, supposed influence of.—Theories of specific poisons of disease,—Molecular theories,—Calatytic theories,—Disease germs.—Tyndall's experiments.—Generation of cell life.—Zymotic diseases,—Farr's classification.—Per cent of sickness and death due to zymotic disease.—Possibilities in its reduction.—Ratio of disease and death.—Diseases induced by crowding, by sewer gas, by too great dryness, by too much dampness, by mineral dust, by occupations.—Effects of marine and inland climates upon consumption.—Analyses of air from schoolrooms and prisons by Michigan State Board of Health, etc., etc.

LECTURE IV.—*Given May 13.*

Air—Continued.

Several methods of ventilation.—Vital statistics.—Preponderance of zymotic diseases indicates defective sanitation.—The numerical method applied to vital statistics.—Action of oxygen.—Material impurities of air.—Influence of air on fermentation.—Effect of pure air.—Experiments of different investigators.—Meteorological influences upon health and type of disease.—Dead air.—Methods of vivifying air.—How facilitated in cities.—Moisture in air.—Different impurities in different localities,—Cities, hospitals, mountains.—Showers of dust and animal and vegetable spores.—Per cent of mortality in hospitals.—Construction of modern hospitals.—Air and rain.—Angus Smith's works, etc., etc.

LECTURE V.—*Given May 20.*

Water and Water-Supply.

Amount required per capita.—How collected.—Quality and preservation from contamination.—Composition—How impure.—Mineral, vegetable, and animal impurities.—Tests for these.—Hardening impurities.—Temperature of springs.—Diseases induced by impure water: dysentery, cholera, malarious fevers, typhoid fever,diarrhœa.—Contamination by fæces, etc.—Methods of purifying water, etc., etc.

LECTURE VI.—*Given May 27.*

Water, etc.—Continued.

Diseases induced by impure water.—Wells, construction of.—American drive-well, etc.—Wells improperly constructed act as drains.—Animal impurities not readily oxidized and changed.—Pollution of water-sheds and rivers by sewage.—Effects of different soils as filters,—sand, clay.—Action of iron, clay.—Chlorine test for sewage.—Rainwater as potable water.—Construction of cisterns, filters.—Ground water: its quantity and movement,—influence on disease, etc., etc.

LECTURE VII.—*Given June 3.*

Drainage and Sewerage.

Lowering of ground water, influence on pulmonary consumption and rheumatism.—Construction of cellars and ground floors of dwellings.—Concrete floors.—Intercepted walls.—Tile drainage: its sanitary value, effect on temperature of ground and air.—Erroneous views as to prevention of pulmonary consumption by inducing a malarious cacexia.—Increase of vitality in drained districts, England.—Length of warm season in temperate climates.—Sewerage, effect on health of cities.—Cholera Asiatica.—Dysentery.—Enteric fever.—Analysis of sewage of London.—Disposal of sewage.—Capt. Liernur's pneumatic system, etc.—Increased attention to sewerage of dwellings.—Methods for village and farm.—Disinfectants: kinds of and amount required for infected sewage, etc., etc.

RELATIVE TO THE

DISEASES IN MICHIGAN DURING THE YEAR 1877;

INCLUDING A SUMMARY FOR THE STATE, AND THE REPLIES BY

CORRESPONDENTS OF THE STATE BOARD OF HEALTH,

To Circular No. 24, Issued by the Board.

COMPILED IN THE OFFICE OF THE SECRETARY OF THE BOARD.

RELATIVE TO DISEASES IN MICHIGAN DURING THE YEAR 1877.

The following summary includes the replies by 36 correspondents, in 35 localities in Michigan, to circular 24, printed on pages 107–110 of this Report, relative to the diseases during the calendar year 1877. It continues the subject of the articles in the Reports for 1876 and 1877, relative to diseases in the State in the years 1875 and 1876, and which were based on replies to similar circulars issued for those years.

In this way has been begun a record for the State, of facts relating to health and sickness and some local conditions which may be supposed to have influence thereon, which will increase in value as each year's replies are added to those already compiled, so that each year may be compared with other years, and the course of diseases or conditions may be traced through a series of years, and be compared with statements of meteorological conditions, water-supply, etc. However valuable each year's replies may be, considered by themselves, this value is greatly increased when we consider them as a part of a series of replies extending over a number of years. In each circular, however, certain of the questions compare the sickness and mortality in the year studied with the rates in former years. Thus it will be seen from the summary of replies to question 4, on page 110, that the sickness during the year 1877 was reported *less* than in former years by a much larger number of correspondents than reported it greater than usual in their localities. The summary of replies to question 5 indicates that during the year 1877, the proportion of deaths to persons sick was also less than in former years. The nature of the information asked for and received can, however, be best understood by a careful study of the circular, the summary of the replies, and, as relates to details, the replies themselves.

Circular 24 was as follows:

[24.] CIRCULAR TO CORRESPONDENTS, RELATIVE TO DISEASES IN MICHIGAN IN 1877.

Office of the State Board of Health,
Lansing, Michigan, January, 1878.

To the Correspondents of the State Board of Health:

Gentlemen:—This Board desires to have, and to place upon record for purposes of future study in connection with records of deaths and of meteorological conditions, statements, for as many different localities in the State as possible, of the diseases in Michigan during the year 1877. Will you have the kindness to send, as soon as is convenient, your replies to the following questions? Please use the stamped envelope enclosed herewith, and leave all additional postage to be paid at this office. In replying, it will not be necessary to repeat the questions, but simply to refer to the circular and to each question by number.

1. If you live in a city or incorporated village, what do you estimate the number of inhabitants of said city or village at the middle of the year 1877?
2. Among these inhabitants above mentioned, what do you estimate the number of deaths from all causes during the year 1877?
3. Please state the territory for which your replies to the following questions are made.
4. Among the people of your locality, considering the increase or decrease of population, was the amount of *sickness* from all causes during the year ending Dec. 31, 1877, *greater*, *less*, or about *the same as the average* during previous years? If not the same, how much was it increased or diminished?
5. Compared with previous years, and from all causes, was the ratio of *deaths* to inhabitants during the year 1877, *greater*, *less*, or about *the same as the average?* If not the same, how much was it increased or diminished?
6. What diseases, or causes of death, were *more* than usually prevalent during the year 1877?
7. If you can assign any *cause for* the *unusual prevalence* of any disease, please do so.
8. What diseases, or causes of death, were *less* than usually prevalent?
9. To what do you attribute the lessened prevalence?
10. From what diseases or causes was there *more* than the usual mortality during the year 1877?
11. If you can assign any *cause for* the *unusual mortality* from any disease, please do so.
12. From what diseases or causes was there *less* than the usual mortality?
13. To what do you attribute the lessened mortality?
14. Please mention dates of the occurrence in 1877 of all diseases attended with an *unusually high or low rate of mortality*, and state whether the rate was high or low.
15. Please mention dates of the occurrence in 1877 of all *diseases not usually occurring in your locality.*
16. State number of cases of each of these diseases; viz., small-pox, cholera, scarlet fever, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, diphtheria, and any other epidemic, endemic, contagious, or infectious disease that appeared during 1877. (Facts are especially desired, but opinions are better than no statements, though it will be well to state them as opinions.)
17. Of the eight diseases mentioned above, *name those of which no case appeared* during the year 1877.
18. For each of months in 1877, please give a summary statement of the diseases which occurred, naming them in the order of their prevalence,—greatest first.

19. During the year 1877, *what diseases* occurred, *at what time*, and *to what extent, among animals?*

20. During the year 1877, what diseases, as rot, rust, smut, bunt, mildew, or mould, occurred among the crops, as potatoes, hops, fruits, and especially cereals and grasses?

21. As regards rye, oats, corn, buckwheat, and other grains raised in 1877, wheat in particular, what was the actual condition when ready for market or use?

22. Were any of these grains, mentioned in question 21, affected by any kind of fungus?

23. Was the wheat raised in 1877 generally allowed to get thoroughly dry before it was threshed?

24. Did a *greater*, a *less*, or the *usual proportion* of wheat raised in 1877 "bank" in the bin?

25. Was the hay crop, secured in 1877, *more* or *less than usually* affected by mildew or mould?

26. Please give a summary statement of the meteorological conditions during the year 1877, specifying, if possible, the general characters for each month, and noting any peculiar or unusual conditions.

27. Please state the facts concerning the *soil moisture* in your locality, during each of the months in the year 1877, *without reference to previous years*, but comparing the months, in 1877, with each other. Group them in order—driest first.

28. *Compared with previous years* in what months of the year 1877 was the *soil* in your locality *unusually dry?*

29. *Compared with previous years* in what months of the year 1877 was the *soil* in your locality *unusually moist?*

30. In your locality, what is the *usual average depth of earth above the ground water*, as indicated by distance down to water in wells, streams, etc.? If different parts of your locality vary greatly, please answer for such different parts.

31. Without reference to previous years, please state the facts concerning the *depth of earth above the ground water* nearest the surface, in your locality, during each month of the year 1877, as indicated by the distance down to water in wells, streams, etc., or by other facts. How many feet and inches do you estimate it, in each month?

32. Compared with previous years, in what months of the year 1877 was the *ground water* in your locality *unusually high?*

33. Compared with previous years, in what months of the year 1877 was the *ground water* in your locality *unusually low?*

34. Please communicate facts bearing upon, or cases illustrating the causation or communicability of diseases.

Any suggestions which you may feel inclined to make, concerning methods which seem practicable, for the prevention of sickness or deaths, in your locality, or in this State, need not be withheld.

As stated after question 16, in the absence of positive knowledge, opinions are desired. The fact that it will be difficult, and sometimes impossible, to give the information asked for is well understood; the importance of the subject, however, warrants the effort which it is believed will not always be barren of results, but will tend to accumulate data which eventually will be of great value to the people.

By direction of the State Board of Health.

Very Respectfully,
HENRY B. BAKER,
Secretary.

1, 2.* Questions 1 and 2 were asked with especial reference to cities and incorporated villages; but several replies were received from other localities. From 28 localities, replies were received to both these questions giving a known or an estimated number of deaths for a known or an estimated population. The total population of these 28 localities, as reported, is 218,980; the number of deaths in 1877, as reported, was 3,393, an annual death-rate of 16 per thousand inhabitants. The highest death-rate reported was in the city of Ludington, 40 per thousand; the lowest was reported by G. E. Corbin, M. D., of St. Johns, 1 per thousand. These two questions were not contained in the two preceding circulars. Had they been, doubtless more of the correspondents would have been prepared to answer them.

3. All except 1 of the 36 correspondents who replied to the circular, answered this question quite definitely. It is of course essential in any study of the replies that there be as definite a statement as possible of the territory to which they refer.

4. In answer to this question, 19 correspondents stated that the amount of sickness from all causes during the year 1877 was less than the average of previous years; 13 stated that it was about the same as the average; 4, that it was greater than the average. Of the 19 who stated that the amount of sickness was less than the average, 13 stated how much less they think it was,—the range being from 10 per cent to 50 per cent, and the average decrease reported by them being 27 per cent. Of the 4 who stated that the amount of sickness was greater than the average, one said that it was nearly 23 per cent greater. Of the 13 who stated that it was about the same as the average, one said that it was "about an average, but more than last year." It is hardly probable that in the 4 localities, Rockford, Saginaw City (nearly 23 per cent greater), Albion, and Hillsdale county, from which the amount of sickness was reported greater than the average of previous years, the increase was equal to the decrease in the 19 localities from which the amount of sickness was reported less, in 13 of which the average decrease was 26 per cent. A comparison of this summary with that of the replies to the same question for 1876, page 169 of the Fifth Annual Report, would seem to indicate, so far as the localities from which reports are received represent the State, that the amount of sickness in Michigan in 1877 was not greater, perhaps it was even less, than it was in 1876, when it seemed to be less than the average of preceding years, though not so much less as in 1875.

5. In answer to this question, 15 correspondents stated that the ratio of deaths to inhabitants was less than the average; 16 stated that it was the same as the average; 4 stated that it was greater than the average, one of them saying that it was nearly 23 per cent greater. Of the 15 who stated that the ratio of deaths to inhabitants was less than the average, 7 stated how much less they

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

think it was,—the range being from 1 per cent to 67 per cent, and the average decrease reported by them being 22 per cent.

6. In reply to this question, 11 correspondents stated that no disease or cause of death was more than usually prevalent; 4 made no statement. By the other 20 correspondents, the following diseases and causes of death were re-reported as more than usually prevalent during the year 1877: scarlet fever, by 6; diphtheria, by 6; consumption, by 4; cholera infantum, typhoid fever, and whooping-cough, each by 3; dysentery, myelitis, and small-pox, each by 2; bilious fevers, bronchitis, cancer, influenza, old age, pneumonia, puerperal eclampsia, rubeola, still-births, and sudden deaths, each by 1.

7. In answer to this question, 20 correspondents made no statement, 12 of them having stated, in answer to question 6, that no disease or cause of death was more than usually prevalent; 6 stated that they could assign no cause for increased prevalence of diseases reported. Among the reported causes of increased prevalence of different diseases, unfavorable climatic conditions were mentioned by four correspondents; contagion, was mentioned by 3.

8. In reply to this question, 4 correspondents stated that no disease or cause of death was less than usually prevalent; diphtheria and malarial diseases were reported as less than usually prevalent, by 6 correspondents; scarlet fever, typhoid fever, pneumonia, and dysentery, by 4; consumption, diarrhea, and measles, by 2; bilious diseases, bronchitis, cerebro-spinal meningitis, croup, entero-colitis, fits, intermittent and remittent fevers, liver complaints, pleurisy, puerperal fever, small-pox, typho-malarial fever, whooping-cough, and zymotic diseases, each by 1; all diseases, by 1; all except consumption, by 1; all except influenza, small-pox, and whooping cough, by 1; one correspondent said that there were less sudden changes of temperature and less sudden changes of heat and cold; one, that there was no epidemic; 3 made no statement.

9. In answer to this question, 10 correspondents made no statement, 4 of them having stated, in answer to question 8, that no disease or cause of death was less than usually prevalent; 6 stated that they could assign no cause for decreased prevalence of diseases reported. Among the reported causes of increased prevalence of different diseases, favorable climatic conditions were reported by eight correspondents; drainage, dryness, and improvement of the soil, by 9; other favorable sanitary conditions, by 5.

6–9. Only brief summaries of the replies to these questions are given above; a more complete tabular view of the whole subject may be had by turning to Exhibit 2, pages 114–115.

10. In answer to this question, 12 correspondents stated that from no disease or cause was there more than the usual mortality during the year 1877; consumption was reported by 6 correspondents to have caused more than the usual mortality; diphtheria was so reported by 5; cholera infantum and scarlet fever, by 3; myelitis, old age, and small-pox, by 2; cancers, chronic diseases, croup, dysentery, puerperal eclampsia, pneumonia, still-births, and typhoid fever, each by 1. The mortality of young children was reported unusually great by 1 correspondent; 8 made no statement.

11. In answer to this question, 23 correspondents made no statement, 12 of them having stated, in answer to question 10, that from no disease or cause was there unusual mortality; 5 stated that they could assign no cause for the unusual mortality reported; unfavorable climatic conditions were reported by 2 correspondents as causes of unusual mortality; hard times, contagion, malignant type of diphtheria, unsanitary surroundings, and use of nursing-bottles, each by 1.

12. In answer to this question, 4 correspondents stated that from no disease or cause was there less than the usual mortality during the year 1877; malaria and malarial diseases and scarlet fever were reported by 4 correspondents to have caused less than the usual mortality; dysentery, pneumonia, and typhoid fever were so reported by 3 correspondents; consumption, diphtheria, and typho-malarial fever, by 2; cerebro-spinal meningitis, diarrhea, fevers, fits, malignant fevers, intermittent and remittent fevers, diseases of old age, and diseases incident to hot weather, liver complaints, pleurisy, puerperal fever, pulmonary diseases, each by 1; all diseases, by 1; all except consumption, by 1; all except consumption, cholera infantum, and diphtheria, by 1; all except malignant diseases and consumption, by 1; fever generally, by 1; zymotic diseases, by 1; 7 made no statement.

13. In answer to this question. 12 correspondents made no statement, 4 of them having stated, in answer to question 12, that from no disease or cause was there less than the usual mortality; 3 stated that they could assign no cause for the lessened mortality reported. Among the reported causes of lessened mortality from different diseases, favorable climatic conditions were reported by 4 correspondents; better drainage and other improved sanitary conditions, by 9.

10–13. A tabular view of the substance of the replies to questions 10–13 is given in Exhibit 3, pages 116–117, wherein the subject may, for some purposes, be better studied.

14. In answer to this question, 6 correspondents stated that during the year 1877 no disease occurred in their localities attended with an unusually high or an unusually low rate of mortality. The following diseases were reported as having been attended with an unusually high rate of mortality: consumption, all the year, by 1 correspondent,—October 1 to December 15, by 1; lung diseases, in January, February, March, and December, by 1; diphtheria, in January and February, by 1,—November 10 to December 31, by 1,—in December, by 1; small-pox, in March, April, and May, by 1; dysentery, in August, by 1; cholera infantum, in July and August, by 1; bowel complaints, in July, August, and September, by 1. The following diseases were reported as having been attended with an unusually low rate of mortality: scarlet fever, in January and April, by 1 correspondent,—in Fall and Winter, by 1,—September to December 31, by 1,—in August, September, October, November, and December, by 1; measles, in May, by 1; cholera infantum, July 1 to September 15, by 1. Eleven correspondents either made no statement or said that they could not answer the question. Six gave answers so indefinite that they cannot be summarized.

15. In reply to this question, 11 correspondents stated that during the year 1877 no disease occurred not usually occurring in their localities; 2 reported the date of the unusual disease, but not its name; 1 reported the name but not the date; 11 either made no reply or said that they could make none. The following diseases were reported as having occurred in localities where they do not usually occur: diphtheria, November 10 to December 31, by 1 correspondent,—in December, by 1,—in January, February, and March, by 1,—in March, by 1; scarlet fever, May 1, by 1,—from July to December, inclusive, by 1,—November 7, by 1; small-pox, in March, April, and May, by 1,—January 7, by 1; puerperal fever, in April, May, and December, by 1; whooping-cough, January 1 to April 21, by 1; cerebro-spinal meningitis, August 1, by 1.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108–9 of this Report.

EXHIBIT 1.—*Eleven Geographical Divisions of the State, formed for the purpose of facilitating the Study of Causes of Sickness and of Deaths, with a List of Counties included in each Division.*

1. Upper-Peninsular.	2. North-western.	3. Northern.	4. North-eastern.	5. Western.	6. Central.	7. Northern-Central	8. Bay and Eastern.	9. South-western.	10. Southern-Central.	11. South-eastern.
Baraga.	Benzie.	Antrim.	Alcona.	Kent.	Barry.	Clare.	Bay.	Allegan.	Branch.	Macomb.
Chippewa.	Gr. Traverse.	Charlevoix.	Alpena.	Lake.	Clinton.	Gladwin.	Huron.	Berrien.	Calhoun.	Monroe.
Delta.	Leelanaw.	Cheboygan.	Iosco.	Mason.	Eaton.	Isabella.	Lapeer.	Cass.	Hillsdale.	Oakland.
Houghton.	Manistee.	Emmet.	Ogemaw.	Muskegon.	Genesee.	Mecosta.	Saginaw.	Van Buren.	Jackson.	Wayne.
Isle Royal.	Manitou.	Kalkaska.	Presque Isle.	Newaygo.	Gratiot.	Midland.	Sanilac.		Kalamazoo.	
Keweenaw.	Missaukee.	Otsego.		Oceana.	Ingham.	Roscommon.	St. Clair.		Lenawee.	
Mackinac.	Wexford.			Osceola.	Ionia.		Tuscola.		St. Joseph.	
Marquette.				Ottawa.	Livingston.				Washtenaw.	
Menominee.					Montcalm.					
Ontonagon.					Shiawassee.					
Schoolcraft.										

The replies by correspondents are grouped by Geographical Divisions of the State, shown in this exhibit, and alphabetically by localities within the divisions. The exhibit is printed here, in order to aid in turning to replies from particular localities, without referring to the index, and that reference may readily be made to it, by page, from the exhibits which follow.

The weekly reports of diseases for the year ending December 29, 1877, the compilation of which is printed in this volume, are also compiled with reference to these Geographical Divisions.

EXHIBIT 2.—*Indicating by Geographical Divisions of the State and by Localities, the Diseases of Increased and of Lessened Prevalence in Michigan during the year 1877, and the supposed Causes of Increased and of Lessened Prevalence,—as Compiled from the Replies of 33 Correspondents to Questions 6, 7, 8, and 9 of Circular 24 from the State Board of Health.*

Divisions * and Localities.	Diseases of Increased Prevalence.	Supposed Causes of Increased Prevalence.	Diseases of Lessened Prevalence.	Supposed Causes of Lessened Prevalence.
All Localities.	See Summary of Replies to Question 6, page 111.	See Summary of Replies to Question 7, page 111.	See Summary of Replies to Question 8, page 111.	See Summary of Replies to Question 9, page 111.
UPPER-PENINSULAR.*				
Stoneville	Scarlet fever	Contagion	None.	
WESTERN.*				
Grand Rapids			Bronchitis, pneumonia, whooping-cough.	
Ludington	I cannot say that any was.		No serious epidemic in a year.	Neither too wet, too dry, or too warm in the Summer, nor too cold in the Winter.
Rockford	Diphtheria	Epidemic	Typhoid fever	Better treatment and sanitary measures.
CENTRAL.*				
DeWitt	Bronchitis and whooping-cough.	Of bronchitis, the great rainfall and the irritable state of the bronchial mucous membranes, following whooping-cough; of whooping-cough, contagion at school.	Consumption	Possibly the mildness of the Winter.
Hastings	About the average		About the average.	
Howell	Dysentery	Cannot say	Cannot say.	
Greenville	Diphtheria and cholera infantum.	Improper sewerage, nearness of cesspools and privies to wells, negligence of city authorities.	Malarial diseases	Improvement of country,—and less plowing, on account of greater stock-raising.
Otisville	Diphtheria and typhoid fever	Atmospheric conditions	Intermittent and remittent fevers, diarrhea, and entero-colitis.	Improved sanitary surroundings.
Ovid	None.			
BAY AND EASTERN.*				
Bay City	Small-pox	Contagion	Croup and diphtheria	Drainage and general improvement of the ground.
East Saginaw[1]	None		Diphtheria and scarlet fever	I can give no reason.
East Saginaw[2]	Consumption		All, except consumption	Less intemperance in eating and drinking, less hard labor, and consequently less exposure.
Saginaw	Cholera infantum, pulmonary consumption, dysentery, pneumonia, still-births, and deaths of very young children.	Hard times among the poor	Scarlet fever, plurisy, liver complaints, fits, malarial fevers, and diphtheria.	Cannot say.
Thornville	None		The whole class of bilious or malarious diseases.	Improved drainage of the country.
SOUTH WESTERN.*				
Allegan	None		Zymotic and malarial diseases.	Better water-supply and improved general sanitary conditions.
Bangor	None		Fevers of a typho-malarial nature.	Better drainage and a more even temperature.
Mattawan	Myelitis	Cannot	All diseases influenced by malarial forms.	Dryness of the soil.

Niles	Sudden deaths generally attributed to heart disease.		Malarial and typhoid fevers	Favorable weather.
Otsego	Scarlet fever	We seldom have it	None.	
Paw Paw	Old age, cancers, myelitis or diseases of the brain.	I cannot	Typhoid fevers and pneumonia	Moderately dry seasons, and better drainage of low lands.
St. Joseph	Consumption and scarlet fever	Of consumption, absence of humidity, and long-continued low temperature, in Winter of 1876-7.	Malarial diseases	Clearing of the land, more general cultivation and drainage, more wholesome domestic conditions, and to heat and moisture not being both in excess at the same time.
Pokagon	None		Scarlet fever, measles, dysentery, diphtheria.	No contagious disease prevailing.
SOUTHERN-CENTRAL.*				
Albion	Scarlatina and diphtheria	Cannot	Less sudden changes of temperature, and not the usual amount of excessive heat and cold.	
Deerfield	None		None.	
Hillsdale	Scarlet fever, diphtheria, whooping-cough, rubeola, typhoid fever, bilious fever.	To extremely dry and hot weather in July, following extremely wet weather.	Puerperal fever, consumption, cerebro-spinal meningitis, and dysentery.	Unknown.
Augusta	None		All	General causes, meteorological, internal, etc.
Hudson	Scarlet fever, typhoid fever		Diphtheria, small-pox, pneumonia, dysentery, and diarrhea.	Do not know.
Kalamazoo	None		Dysentery, typhoid fever, and pneumonia.	Unusually dry soil in Fall and Winter, 1876-7, and in July and August, 1877.
Mendon	None		Malarial	Drainage of marshes, and the breaking up of no more virgin soil.
Three Rivers			Malarial diseases	No extremely dry months; streams not very low; Summer months not hot; no extremes of heat and cold.
SOUTH-EASTERN.*				
Detroit	Influenza, small-pox, and whooping-cough.	Small-pox to not having every person properly vaccinated.	All other diseases	Hard times, and more attention to the laws of hygiene.
Northville	Diphtheria, consumption, and old age.	Cannot.		
Wyandotte	Puerperal eclampsia and cholera infantum.	Unknown	Scarlet fever, measles, and diphtheria.	Unknown.

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* For Counties in each division, see Exhibit 1, page 113.

[1] Nelson H. Claflin, M. D. [2] Samuel Kitchen, M. D.

EXHIBIT 3.—*Indicating, by Localities in Michigan, the Diseases from which there was Increased Mortality, the Diseases from which there was Lessened Mortality, during the Year 1877, and the supposed Causes of Increased and of Lessened Mortality,—As Compiled from the Replies of 32 Correspondents to Questions 10, 11, 12, and 13 in Circular 24 from the State Board of Health.*

Divisions* and Localities.	Diseases of Increased Mortality.	Supposed Causes of Increased Mortality.	Diseases of Lessened Mortality.	Supposed Causes of Lessened Mortality.
All Localities.	See Summary of Replies to Question 10,—page 111.	See Summary of Replies to Question 11,—page 111.	See Summary of Replies to Question 12,—page 112.	See Summary of Replies to Question 13,—page 112.
UPPER-PENINSULAR.*				
Stoneville	None		None.	
WESTERN.*				
Ludington	None		From diseases malignant or otherwise.	Want of causes.
Rockford	Diphtheria	Malignant type	Typho-malarial	Sanitary regulation.
CENTRAL.*				
De Witt	None		Pulmonary consumption.	
Hastings	About the average.		About the average.	
Howell	Dysentery, chronic diseases, and pulmonary consumption.		Unknown.	
Greenville	Diphtheria, cholera infantum, and consumption.	Cannot	All other diseases	Improvement of country, and less plowing, on account of greater stock-raising.
Otisville	Diphtheria and typhoid fever	Unsanitary surroundings	Intermittent and remittent fevers, and pulmonary diseases.	Atmospheric conditions.
Ovid			Scarlet fever	Cases nearly all of mild variety.
BAY AND EASTERN.*				
Bay City	None except small-pox	Contagion	Fevers generally	Better drainage and a good water-supply.
East Saginaw[1]	None		I know of none.	
East Saginaw[2]	Consumption	Cold, damp, and unseasonable weather.	All others	Less intemperance in eating and drinking, less hard labor, and consequently less exposure.
Saginaw	Cholera infantum, pulmonary consumption, dysentery, pneumonia, still-births, and deaths of very young children,—disease not known.	Hard times among the poor	Scarlet fever, plurisy, liver complaints, fits, malarial fevers, and diphtheria.	Cannot say.
Thornville	None		Mortality about an average.	
SOUTH-WESTERN.*				
Allegan	None		Zymotic	Better water-supply, and improved general sanitary condition.
Bangor	None		Fevers of a malignant type	Lessened number of cases.
Mattawan	Myelitis only	Cannot	Malarial complications	Dryness of the soil.
Niles	Old age and consumption	Cannot	Typhoid and typho-malarial fevers	Favorable weather.
Otsego	Scarlet fever		Little mortality except from consumption and diseases necessarily fatal.	Mildness of the diseases.
Paw Paw	Old age, cancers, and myelitis	Cannot		

St. Joseph	Consumption	Clearing of the land, more general cultivation and drainage, more wholesome domestic conditions, and to heat and moisture not being both in excess at the same time.	Scarlet fever, and malarious diseases.	Mildness of scarlet fever, less congestive, intermittent, and pernicious remittent.
Pokagon	None		Pneumonia	Mildness of Winter months.
SOUTHERN-CENTRAL.*				
Albion	Scarlatina and diphtheria		Diseases of old age and diseases incident to hot weather.	To improved climatic influences.
Deerfield	None		None.	
Hillsdale	Scarlet fever, diphtheria and croup.	Cannot	Consumption, cerebro-spinal meningitis, puerperal fever.	Unknown.
Augusta	None		All	Diminished prevalence and milder type.
Hudson			Diphtheria, small-pox, pneumonia, dysentery, and diarrhea.	
Kalamazoo	None		Dysentery, typhoid fever, and pneumonia.	Unnsually dry soil in Fall and Winter, 1876-7, and in July and August, 1877.
Mendon	None		Malarial	Drainage of marshes, and breaking up of no more virgin soil.
Three Rivers			Malaria	Not much malaria generated.
SOUTH-EASTERN.*				
Detroit	Small-pox		See table of deaths.	
Wyandotte	Puerperal eclampsia and cholera infantum	Cholera infantum perhaps caused by the use of nursing-bottle.	Scarlet fever and typhoid fever	Unknown.

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* For counties in each division, see Exhibit 1, page 113.

[1] Nelson H. Claflin, M. D. [2] Samuel Kitchen, M. D.

16, 17. Of the 36 correspondents who replied to the circular, 6 made no statement in answer to question 16, and one made no statement in answer to question 17. In reply to question 16, one correspondent stated there were a few cases of typho-malarial fever; and one, that besides the cases of scarlet fever, typhoid fever, and measles which he reports, there was no other epidemic, endemic, or contagious disease. The statements concerning the diseases named in these questions are summarized as follows:

Small-pox.—Concerning this disease, 3 correspondents did not reply; 30 stated that no cases occurred in their localities; one reported 2 cases; one reported 1 case; one, 107 deaths.

Cholera.—Concerning this disease, 2 correspondents did not reply; 34 stated that no case occurred in their localities.

Scarlet fever.—Concerning this disease, 6 correspondents did not reply; 4 stated that no case occurred in their localities; 3 stated that there were a few cases; one, that there were many; one, that the number of cases was "into the hundreds"; 20 reported a total of 288 cases, or an average of 14 cases, ranging from 1 to 60 cases; one, 75 deaths.

Typhoid fever.—Concerning this disease, 9 correspondents made no reply; 7 stated that no cases occurred in their localities; 2 stated that there were a very few cases; one that there were several; 16 reported a total of 97 cases, or an average of 6 cases, ranging from 1 case to 20 cases; one reported 49 deaths.

Measles.—Concerning this disease, 10 correspondents made no statement; 19 stated that no case occurred in their localities; one stated that there was "much"; one, that were some sporadic cases; 4 reported a total of 141 cases, or an average of 35 cases, ranging from 1 case to 100 cases; one reported 2 deaths.

Whooping-cough.—Concerning this disease, 7 correspondents made no reply; 7 stated that no case occurred in their localities; 6 stated that there were a few cases; 3, that there were many cases; 12 reported a total of 686 cases, or an average of 57 cases, ranging from 1 case to 300 cases; one reported 13 deaths.

Cerebro-spinal meningitis.—Concerning this disease, 5 correspondents made no statement; 23 stated that no case occurred in their localities; 2 stated that there were a few cases; 2 reported 1 case each; 2 reported 2 cases each; one, 3 cases; one, 4 deaths.

Diphtheria.—Concerning this disease, 7 correspondents made no reply; 8 stated that no case occurred in their localities; 3 stated that there were a few cases; 2, that there were many cases; 15 reported a total of 155 cases, or an average of 10 cases, ranging from 1 case to 40 cases; one reported 54 deaths.

18. Of the 36 correspondents who replied to the circular, 16 made statements, by months, in reply to this question,—one of them, however, for only the last 9 months of the year. A summary of the replies to this question is given in Exhibit 4, pages 120–1. In this summary for 1877 are included the replies by 2 regular correspondents of the Board to a similar question, as given in the report to the Berrien County Medical Society, which is printed in this article. This exhibit also includes a summary of the replies by 46 correspondents to the same question in Circular 15, relative to the diseases of 1876, and by 8 correspondents to the same question in Circular 11, relative to the diseases in 1875. No disease, however, is included in the statement for any month, which was not reported by more than one correspondent in that month in one

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

of these years. In the column for each month, the names of diseases are arranged in the order of greatest area of prevalence during that month of the year 1877 (to which year the replies published in this Report refer), as denoted by the number of correspondents reporting each disease present. The last column of this exhibit gives for certain of these diseases concerning which weekly reports are received, the per cent of observers of diseases who reported them during each month of the year 1877. Additional statements respecting these diseases are given in the article on Weekly Reports of Diseases, printed on subsequent pages of this Report. In studying this exhibit, it is necessary to bear in mind the number of correspondents who replied to the question for each year; these numbers are stated in the head of the exhibit. It is believed that the statements for each successive year increase in value, and that when more of the correspondents take the trouble to record diseases monthly and reply to this question, an exhibit can be made which will very correctly represent the diseases in each month, and render possible accurate comparisons of one year with another. This exhibit is offered not as satisfactory, but as showing what may be done when fuller replies are received; though it is believed itself to have considerable value.

19. In answer to this question, 13 correspondents stated that no disease occurred among animals in their localities; 6 reported hog cholera,—2 of them, as occurring in August and September; 2, as occurring in Fall; 1, as occurring in Summer and Fall; 1, as occurring during Summer months; 2 reported that a few hogs died from unknown disease, one of them stating that it was in the Fall; 7 reported diseases among horses, principally of the respiratory organs; 2 reported pneumonia, but did not state among what animals; 1 reported some disease among cattle; 6 made no statement that answers the question.

20. In answer to this question, 12 correspondents stated that no disease occurred among the crops in their localities; 2 reported smut in wheat; 2, smut in corn; 2, fly in wheat; 1, insects in wheat; 1, blight on fruit trees; 1, rot in potatoes, apples, or other fruit; 4, potato bugs; other statements were made which cannot well be summarized.

21. In reply to this question, 27 stated that the grains in question were marketed in good condition; 2, that they were good except wheat; 1, good except corn; 1, that wheat and hay were secured in good condition.

22. In reply to this question, 18 correspondents stated that the grains in question were not affected with any kind of fungus; 3, that they knew of no fungus; 4 reported disease in corn.

23. In reply to this question, 24 correspondents stated that the wheat raised in 1877 was generally allowed to get thoroughly dry before it was threshed; 2, that it was in most cases; 2, that they think it was not allowed to get thus dry; 1, that one-third of it was damp when threshed.

24. In reply to this question, 13 correspondents stated that less than the usual proportion of wheat banked in the bin; 1, that the usual proportion banked; 1, that a greater than the usual proportion banked; 5, that none, and one that almost none, banked; 2 answered "No," and one, "It did not,"—answers not easily understood.

25. In reply to this question, 12 correspondents stated that the hay crop secured in 1877 was less than usually affected with mildew or mould; 4, that it was about as usual in this respect; 2, that it was more than usually affected with mildew or mould; 1, that much hay was spoiled by wet; 7 gave answers which state or imply that the crop was secured in good condition; 3 answer, "No."

EXHIBIT 4.—*Stating by Months the Number of Correspondents who Reported Cases of certain Diseases in reply to Circulars 11, 15, and 24, relative to Diseases in Michigan in the Years 1875, 1876, and 1877 (18 Correspondents replied for 1877; 46, for 1876; and 8, for 1875),—and also the Per Cent of Observers who made Weekly Reports of most of the same Diseases during the Year 1877.—(See Question 18 of Circular 24, on page 108, also paragraph 18, page 118–119.)*

JANUARY.					FEBRUARY.					MARCH.				
Correspondents Reporting Cases, in reply to Circulars 11, 15, and 24.				Per Ct. of Observers making Weekly Reports of,—1877.	Correspondents Reporting Cases, in reply to Circulars 11, 15, and 24.				Per Ct. of Observers making Weekly Reports of,—1877.	Correspondents Reporting Cases, in reply to Circulars 11, 15, and 24.				Per Ct. of Observers making Weekly Reports of,—1877.
Diseases.	1875.*	1876.*	1877.*		Diseases.	1875.	1876.	1877.		Diseases.	1875.	1876.	1877.	
Bronchitis	2	5	13	85	Bronchitis	2	6	12	89	Bronchitis	..	7	12	90
Pneumonia	8	7	10	88	Pneumonia	5	8	12	86	Pneumonia	5	10	10	81
Diphtheria	2	5	9	51	Influenza	..	..	9	76	Intermittent Fever	1	3	8	71
Influenza	..	..	8	73	Diphtheria	3	4	8	38	Rheumatism	2	5	8	79
Consumption	..	1	7	66	Rheumatism	4	7	7	86	Consumption	1	..	7	59
Remittent Fever	2	..	7	52	Remittent Fever	2	..	6	51	Influenza	..	..	7	72
Rheumatism	4	8	7	82	Consumption	1	1	5	52	Diphtheria	..	2	6	35
Erysipelas	1	2	3	49	Intermittent Fever	1	3	5	69	Remittent Fever	2	..	5	59
Intermittent Fever	1	1	3	69	Scarlet Fever	3	6	3	38	Scarlet Fever	3	6	5	34
Scarlet Fever	3	5	3	43	Cerebro-spinal Men.	..	..	2	8	Measles	..	3	3	16
Whooping-cough	..	..	3	34	Diarrhea	..	1	2	38	Whooping-cough	1	3	3	29
Diarrhea	..	1	2	43	Measles	2	2	2	10	Asthma	..	..	2	----
Typho-malar'l Fever	1	..	2	24	Pharyngitis	..	1	2	----	Erysipelas	..	..	2	40
Measles	1	2	1	12	Whooping-cough	..	2	2	32	Mumps	1	..	2	----
Typhoid Fever	..	2	1	21	Catarrhal Diseases	..	3	..	----	Puerperal Fever	..	..	2	19
Typhoid Pneumonia	2	..	..	----	Typhoid Fever	..	2	..	15	Cerebro-spinal Men.	..	2	1	6
Pleuritis	2	..	..	----	Erysipelas	3	..	1	41	Dropsy	..	2	1	----
					Peritonitis	2	..	..	----	Rheumatic Fever	3	..	..	----
					Malarial Fever	2	..	..	----					

APRIL.					MAY.					JUNE.				
Intermittent Fever	4	3	11	81	Intermittent Fever	4	5	13	93	Intermittent Fever	4	6	14	96
Rheumatism	2	2	11	75	Rheumatism	..	2	10	83	Remittent Fever	1	4	12	67
Bronchitis	2	5	10	80	Remittent Fever	1	2	9	72	Rheumatism	..	2	7	70
Consumption	2	1	8	63	Bronchitis	..	2	8	70	Consumption	..	1	6	61
Pneumonia	4	7	8	72	Consumption	..	1	8	63	Pneumonia	..	2	6	32
Scarlet Fever	3	6	5	38	Pneumonia	2	3	8	57	Bronchitis	1	2	5	46
Erysipelas	..	1	4	50	Diphtheria	..	2	6	15	Cholera Morbus	..	..	5	32
Influenza	..	..	4	59	Influenza	..	..	5	57	Diphtheria	..	1	4	18
Diphtheria	1	1	3	31	Scarlet Fever	2	2	5	33	Influenza	..	..	4	33
Diarrhea	..	1	3	33	Diarrhea	..	1	3	53	Scarlet Fever	1	2	4	37
Remittent Fever	1	1	3	58	Erysipelas	1	1	3	50	Diarrhea	1	2	3	56
Dysentery	..	1	2	16	Measles	1	1	3	27	Whooping-cough	1	5	3	32
Measles	2	2	2	22	Puerperal Fever	..	1	2	10	Cholera Infantum	..	2	2	26
Mumps	1	..	2	----	Whooping-cough	1	4	2	33	Dropsy	..	1	2	----
Puerperal Fever	..	1	2	11	Cerebro-spinal Men.	..	4	..	7	Dysentery	..	1	2	28
Typhoid Fever	..	1	2	16	Asthma	..	2	..	----	Erysipelas	1	..	2	33
Catarrhal Diseases	..	2	1	----						Typhoid Fever	..	2	2	11
Whooping-cough	..	2	..	23						Typho-mala'l Fever	..	1	2	21
										Measles	1	2	2	19

* Eight correspondents replied for 1875; 46, for 1876; and 18, for 1877.

26. In reply to this question, 18 correspondents stated either that they had no records or that they could not give the desired summary statement of meteorological conditions; 1 reported that the seasons were regular and uniform; 1, that there was nothing unusual; 1, that June was probably the only really dry month; 5 made statements by months, which may be found in the replies by Arthur Hazlewood, M. D., of Grand Rapids; C. V. Beebe, M. D., of Howell;

EXHIBIT 4.—*Continued.*

JULY.					AUGUST.					SEPTEMBER.				
Correspondents Reporting Cases, in reply to Circulars 11, 15, and 24.				Per Ct. of Observers making Weekly Reports of,—1877.	Correspondents Reporting Cases, in reply to Circulars 11, 15, and 24.				Per Ct. of Observers making Weekly Reports of,—1877.	Correspondents Reporting Cases, in reply to Circulars 11, 15, and 24.				Per Ct. of Observers making Weekly Reports of,—1877.
Diseases.	1875.*	1876.*	1877.*		Diseases.	1875.	1876.	1877.		Diseases.	1875.	1876.	1877.	
Intermittent Fever	4	6	13	93	Intermittent Fever	4	8	14	95	Intermittent Fever	2	9	16	93
Diarrhea	2	4	12	89	Dysentery	4	5	12	91	Diarrhea	2	9	14	97
Remittent Fever	3	6	10	69	Diarrhea	2	8	11	96	Dysentery	6	5	12	82
Cholera Morbus	..	..	8	67	Remittent Fever	3	5	10	82	Remittent Fever	2	5	10	80
Consumption	..	1	6	53	Cholera Infantum	..	4	9	63	Cholera Infantum	..	5	6	45
Rheumatism	1	1	5	58	Cholera Morbus	..	2	9	77	Rheumatism	..	2	6	67
Cholera Infantum	..	2	4	38	Bronchitis	..	4	5	34	Cholera Morbus	..	1	5	58
Diphtheria	1	3	4	18	Consumption	..	1	5	41	Consumption	..	1	5	42
Dysentery	..	4	4	55	Rheumatism	..	2	4	57	Typho-mala'l Fever	4	4	5	63
Whooping-cough	..	2	4	35	Scarlet Fever	1	2	4	23	Scarlet Fever	1	..	4	22
Scarlet Fever	1	3	4	29	Whooping-cough	..	4	4	34	Typhoid Fever	3	3	4	38
Typho-malar'l Fever	..	1	3	31	Diphtheria	..	2	3	14	Bronchitis	..	1	3	48
Erysipelas	2	2	2	25	Typho-mala'l Fever	3	2	3	43	Diphtheria	1	1	3	22
Dropsy	..	1	2	----	Dropsy	..	1	2	----	Dropsy	..	1	2	----
Measles	1	1	2	16	Erysipelas	1	..	2	23	Erysipelas	..	1	2	18
Pneumonia	..	3	2	24	Typhoid Fever	2	5	2	25	Influenza	..	3	2	35
Typhoid Fever	1	2	1	7	Pneumonia	1	3	1	23	Whooping-cough		4	1	23
					Measles	2	..	..	11	Croup	..	2	..	----
					Bilious Fever	2	..	..	----	Pneumonia	..	2	1	25
										Bilious Remittent	2	..	..	----
										Bilious Fever	2	..	..	----
										Malarial Fever	2	1	1	----
										Measles	2	..	..	5
OCTOBER.					NOVEMBER.					DECEMBER.				
Intermittent Fever	2	9	15	93	Intermittent Fever	2	8	14	88	Intermittent Fever	1	5	14	82
Remittent Fever	4	5	13	85	Remittent Fever	3	3	12	75	Remittent Fever	..	2	10	72
Diarrhea	1	3	9	82	Rheumatism	..	4	11	89	Bronchitis	2	9	9	91
Consumption	..	3	6	71	Bronchitis	1	3	9	87	Diphtheria	1	6	9	41
Diphtheria	1	..	6	44	Diphtheria	..	2	9	46	Rheumatism	1	3	8	86
Dysentery	5	2	6	56	Diarrhea	1	..	7	58	Pneumonia	3	7	7	71
Influenza	..	2	6	55	Consumption	..	2	7	75	Consumption	..	2	6	73
Typho-malar'l Fever	5	2	6	72	Typho-mala'l Fever	2	1	7	55	Scarlet Fever	3	3	5	26
Bronchitis	..	4	5	70	Scarlet Fever	3	2	5	37	Typho-mala'l Fever	1	..	5	44
Rheumatism	..	1	5	84	Influenza	..	2	4	55	Influenza	..	3	4	59
Scarlet Fever	1	2	5	34	Typhoid Fever	..	2	4	38	Whooping-cough	2	5	4	0
Cholera Infantum	1	1	3	23	Whooping-cough	2	4	4	22	Abortion	..	..	2	----
Typhoid Fever	4	2	3	35	Dysentery	..	..	3	22	Asthma	..	1	2	----
Whooping-cough	1	3	3	26	Pneumonia	3	7	3	57	Dysentery	..	1	2	15
Asthma	..	1	2	----	Pleurisy	..	..	2	----	Typhoid Fever	..	3	2	28
Dropsy	..	1	2	----	Erysipelas	1	3	1	26	Croup	1	2	..	----
Pharyngitis	..	..	2	----	Measles	4	1	..	4	Measles	2	..	..	5
Pneumonia	1	3	2	43	Cerebro-spinal Men.	3	1	..	3					
Croup	..	2	..	----										
Erysipelas	1	2	1	32										
Measles	..	3	..	1										
Bilious Fever	..	2	..	----										

*Eight correspondents replied for 1875; 46, for 1876; and 18, for 1877.

A. W. Nicholson, M. D., of Otisville; J. S. Caulkins, M. D., of Thornville; and R. F. Stratton, M. D., of St. Joseph.

27–29. The substance of the replies to these questions, and also a **summary,** are given in tabular form in Exhibit 5, page 122.

30–33. The substance of the replies to these questions, and also a **summary,** are given in tabular form in Exhibit 6, page 123.

EXHIBIT 5.—*Soil Moisture in Michigan by Months during the Year 1877, as indicated by the Replies of 26 Correspondents to Questions 27, 28, and 29 of Circular 24 from the State Board of Health.*

Divisions* and Localities.	Soil Moisture by Months and without Reference to Previous Years. Months in Order of Dryness, Driest First.—(Question 27.)	Soil Unusually Dry. Time.—(Question 28.)	Soil Unusually Moist. Time.—(Question 29.)
All Localities.	†	‡	§
WESTERN.*			
Ludington	No record	Aug. and Sept.	Nov. and Dec.
Rockford	But little variation	At no time	At no time.
CENTRAL.*			
DeWitt	Unknown	Aug.	July, Oct., and Nov.
Greenville	A wet year	Unknown	Unknown.
Otisville	Oct., June, Aug., Nov., Sept., July, April, May, Dec., March, Feb., Jan.	None	All.
BAY AND EASTERN.*			
Bay City	May and June very dry; Nov. and Dec. very wet. A moist season.		Nov. and Dec.
East Saginaw[1]	June the driest; the rest about alike.	Soil always damp	Soil always damp.
Lexington	Unknown		Last half of year
Saginaw City	Unknown	About as usual	About as usual.
Thornville	Feb., July, June, May, Jan., Dec., April, Nov., Sept., Oct., March, Aug.	Feb.	Aug. and Sept.
SOUTH-WESTERN.*			
Allegan	Unknown	At no time	At no time.
Bangor	July, Aug., June, Sept., May, Oct.; the rest all moist.	At no time	Aug. and Sept.
Mattawan		During the year	At no time.
Niles	Unknown	June	July.
Otsego		None	July.
St. Joseph	Feb., Aug., Sept., March, April, Oct., Jan., July, June, May, Dec., Nov.	Feb., May, July, Jan.	Dec.
SOUTHERN-CENTRAL.*			
Albion	Unknown	No great change	No great change.
Deerfield	May, Oct., Feb.	None	Dec., June, and Sept.
Hillsdale	Sept., Aug., July, very dry; Spring months and June, very wet; balance, average.	Sept., August, and July.	Spring months and June.
Augusta	July, Aug., Sept., May, Feb., June, Oct.; others not much different, except Nov. and Dec., which were the wettest.	July and Aug.	Oct., Nov., and Dec.
Hudson	Driest during the Fall	At no time	Spring months.
Kalamazoo	July and August, the driest.	July and Aug.	April, May, Oct., and Nov.
Mendon	Feb., April, June, July, Aug., Sept., dry; Jan., March, May, Oct., Nov., Dec., wet.	Feb., April, and Aug.	May, Nov., and Dec.
Three Rivers		Aug. and Sept.	Spring months.
SOUTH-EASTERN.*			
Northville			Rather dry the entire season.
Wyandotte	Summer and Winter, Spring and Fall.	At no time	All the year.

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* For counties in each division, see Exhibit 1, page 113.

† These statements cannot well be summarized. Most of them name the months in the order of dryness of soil, driest first.

‡ Soil reported **unusually dry** at some time of the year 1877 by 11 correspondents, as follows: In Jan., by 2; in Feb., by 4; in March, by 1; in April, May, and June, by 2; in July, by 5; in Aug., by 9; in Sept., by 4; in Oct., Nov., and Dec., by 1; also reported unusually dry *at no time*, by 6; rather dry the entire season, by 1; always damp, by 1; two reported that it did not vary much.

§ Soil reported **unusually moist** at some time of the year 1877 by 18 correspondents, as follows: In Jan. and Feb., by 1; in March by 4; in April, by 5; in May, by 6; in June, by 3; in July, by 5; in Aug., by 4; in Sept. and Oct., by 5; in Nov. and Dec., by 8; also reported unusually moist *at no time*, by 3; always damp, by 1; two reported that it did not vary much.

[1] Samuel Kitchen, M. D.

EXHIBIT 6.—*Depth of Earth above Ground Water, and Relative Height of Ground Water, in Michigan, by Months, during the Year 1877,—as indicated by the Replies of 32 Correspondents to Questions 30, 31, 32, and 33 of Circular 24 of the State Board of Health.*

Divisions* and Localities.	Usual Depth of Earth Above Ground Water. (Question 30.)	Depth of Earth Above Ground Water by Months.—(Question 31.)	Ground Water Unusually High. Time.—(Question 32.)	Ground Water Unusually Low. Time.—(Question 33.)
All Localities.	†	‡	§	‖
UPPER-PENINSULAR.*				
Stoneville	20 ft.; varies on account of nearness to mines.	No record	Not observed.	
WESTERN.*				
Ludington	3 to 70 ft.	Varies from 1 to 8 feet.	Nov. and Dec.	Aug. and Sept.
Rockford	25 ft.	25 ft.	At no time	At no time.
CENTRAL.*				
De Witt	20 to 45 ft.; in some parts of township, much less.	But little variation.	Oct. and Nov.	None.
Hastings	20 to 45 ft.	Very little change	None	None.
Howell	40 ft.	Unknown	Unknown	Unknown.
Greenville	25 ft.		All the year	None.
Otisville	5 to 10 ft.	Lower in early months than in the succeeding ones.	All the year	None.
St. Johns	12 to 30 ft.	Does not vary much.		
BAY AND EASTERN.*				
Bay City	10 to 15 ft.	Unknown	Unknown	Unknown.
East Saginaw [1]	1 to 3 ft.	Unknown	Unknown	Unknown.
East Saginaw [2]	1 ft.	Unknown	Unknown	Unknown.
Lexington	8 ft.			
Saginaw City	2 to 6 ft.	2 to 6 ft.	About as usual	About as usual.
Thornville	20 to 100 ft.	Unknown	Aug. and first half of Sept.	July and Feb.
WESTERN.*				
Allegan	25 ft.	Unknown	None	None.
Bangor	20 to 30 ft.	Unknown	At no time	At no time.
Mattawan	25 ft.		At no time	July, Aug., and Sept.
Niles	On flats, 10 ft.; on hills, 35 ft.	Unknown	Unknown	Unknown.
Otsego	16 ft.			
Paw Paw	25 ft.	Does not vary much.	Does not vary much.	Does not vary much.
St. Joseph	In village, 3 to 70 ft.; in country, 10 to 30 feet.	6 ft. in Feb., May, and July; other mos., 6 in. to 6 ft.	April, June, Nov., Dec.	Feb., May, July, Aug., Sept.
Pokagon	In valleys, 12 to 20 ft.; on high lands, 20 to 70 ft.			
SOUTHERN-CENTRAL*				
Albion	10 to 30 ft.	Unknown	Unknown	Unknown.
Deerfield	4 to 50 ft.	Unknown	No great variation	No great variation
Augusta	10 to 14 ft.	Unknown.		
Hudson	20 ft.	Unknown	At no time	At no time.
Kalamazoo	Valley plains, 10 to 20 ft; prairies, 60 to 100 ft.		April and Oct.	July and Aug.
Mendon	16 ft.	Unknown	Nov. and Dec.	Feb. and July.
Three Rivers	22 to 28 ft.	Streams high until Fall; then low; high in Oct., Nov., and Dec.; not very low at any time.	July, Aug., Sept.	Jan., Feb., March, April, May, June, Oct., Nov., Dec.
SOUTH-EASTERN.*				
Northville	8 to 40 ft.	Unknown.		
Wyandotte	1 to 12 ft.	Unknown	Spring and Fall.	Lowest in Summer.

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* For counties in each division, see Exhibit 1, page 113.

† To this question, replies were made by all but 3 of the 35 correspondents who replied to the Circular.

‡ In answer to this question, 10 correspondents made statements concerning the depth of earth above ground water in 1877.

§ Ground water reported **unusually high** at some time of the year 1877 by 10 correspondents, as follows: In Jan. and Feb., by 2; in March, by 3; in April, by 5; in May, June, and July, by 3; in Aug., by 4; in Sept. and Oct., by 5; in Nov., by 7; in Dec., by 5; also reported unusually high *at no time*, by 5; 3 reported that it did not vary much.

‖ Ground water reported **unusually low** at some time of the year 1877 by 8 correspondents, as follows: In Jan., by 1; in Feb., by 4; in March and April, by 1; in May and June, by 2; in July, by 6; in Aug., by 5; in Sept., by 3; in Oct., Nov., and Dec., by 1; also reported unusually low *at no time*, by 7; 4 reported that it did not vary much.

[1] Nelson H. Claflin, M. D. [2] Samuel Kitchen, M. D.

34. Of the 36 correspondents who replied to the circular, 25 made no statement that answers this question. The other 11 gave replies which may be briefly mentioned as follows:

D. W. C. Burch, M. D., of Rockford, mentioned "over-eating, cesspools, and privies."

Suggestion as to enforcing the law in relation to throwing sawdust into streams or carting it on the land to rot; also as to improved sewerage of small cities. See reply by O. E. Herrick, M. D., of Greenville.

A. W. Nicholson, M. D., of Otisville, believes "coëxisting increased barometric pressure and diminished quantity of active oxygen to greatly influence increase of sickness."

Cases of catarrh, influenza, and pneumonia attributed to over-crowded and ill-ventilated school-rooms; reckless draining of privy-vaults into quicksand from which the water-supply of the village is received. See reply by G. E. Corbin, M. D., of St. Johns.

Malarial poison, surface water, sewage, barn and privy poisons, as causing disease. Suggestion for law compelling those in charge of cemeteries to keep a register of name, age, birth-place, cause of death, etc., of every person buried therein. See reply by N. D. Lee, M. D., of Saginaw City.

Bad privy arrangements a fruitful source of disease. See reply by H. S. Lay, M. D., of Allegan.

Myelitis believed to be allied to rheumatism and cerebro-spinal meningitis. See reply by Thos. H. Briggs, M. D., of Mattawan.

Intermittent fever believed to induce consumption, and illustration of communicability of scarlet fever. See reply by R. F. Stratton, M. D., of St. Joseph.

Unusual mildness of hay-fever attributed to a less than usual abundance of rag weed (*Ambrosia artemisiæfolia*). See reply by Chas. P. Wells, M. D., of Pokagon.

Necessity for strict enforcement of the laws with regard to contagious diseases shown by experience with scarlet fever and diphtheria. Suggestion for law compelling physicians to report births, deaths, and sickness. See reply by John P. Stoddard, M. D., of Albion.

Suggestion to lay drainage pipes with the sewers. See reply by W. H. Rouse, M. D., of Detroit.

For convenience of study and reference, the replies to the circular are grouped by geographical divisions of the State, shown in Exhibit 1, page 113. The replies are as follows:

UPPER-PENINSULAR DIVISION OF THE STATE.[*]

REPLIES BY TOWNSEND HEATON, M. D., OF STONEVILLE, MICH.

1.[†] I do not live in a city or incorporated village.

3. I answer for the townships of Ishpeming and Tilden, Marquette county, covering a radius of about eight miles.

4, 5. About the same as the average.

6. Scarlet fever was more than usually prevalent.

7. Contagion.

8, 10, 12. None.

14. The record was imperfectly kept, and I cannot answer.

15. Scarlet fever about the first of May.

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[*] For counties included in each division, see Exhibit 1, page 113.

[†] [illegible] ning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

16. Small-pox, none; cholera, none; scarlet fever, about 20; typhoid fever, about 6; measles, none; whooping-cough, about 40; cerebro-spinal meningitis, none; diphtheria, none; and no other epidemic, endemic, or contagious disease appeared.
17. Small-pox, cholera, measles, cerebro-spinal meningitis, and diphtheria.
18. I cannot do it.
19, 20. None have occurred.
21, 22, 23, 24. None were raised.
25. No difference from former years.
26, 27, 28, 29. I have not observed.
30. Twenty feet. It varies on account of proximity to mines.
31. I have no record.
32, 33. I have not observed.
34. I have none to communicate.

I intend to keep an accurate record this year, and next January I hope to be able to answer you more satisfactorily.

Very respectfully,

Stoneville, Marquette Co., Feb. 19, 1878. TOWNSEND HEATON, M. D.

REPLIES BY ARTHUR HAZLEWOOD, M. D., OF GRAND RAPIDS, MICH.

1. Estimated population, 29,000.
2. Deaths, 360.
3. The city of Grand Rapids and 5 miles around.
4. Less, about 15 per cent.
5. About the average.
8. Bronchitis, pneumonia, whooping-cough.
16. In a city of the size of Grand Rapids, it is utterly impossible to answer this question with figures as facts; yet I am morally certain that we had *no* cases of small-pox or cholera; of the other endemic or contagious diseases we have had some sporadic cases during the year, but not to the extent of an epidemic.
17. Small-pox and cholera.
18. *January:* Influenza, bronchitis, consumption, remittent fever, diphtheria.
    February: Indigestion, influenza, remittent fever, diphtheria, scarlet fever, pneumonia.
    March: Derangements of the digestive organs, intermittent fever, influenza, consumption, diphtheria, and scarlet fever.
    April: Remittent and intermittent fevers, influenza, and consumption.
    May: Remittent fever, influenza, consumption, erysipelas, diphtheria, scarlet fever.
    June: Remittent and intermittent fevers, influenza, diphtheria, consumption, erysipelas, cholera morbus.
    July: Diarrhea, remittent fever, consumption, diphtheria, measles.
    August: Diarrhea, remittent fever, dysentery, cholera infantum, consumption, diphtheria.
    September: Remittent fever, diarrhea, dysentery, influenza, cholera infantum.
    October: Remittent and intermittent fevers, influenza, diphtheria, consumption.
    November: Remittent and intermittent fevers, rheumatism, consumption.
    December: Remittent and intermittent fevers, bronchitis, consumption, and rheumatism.
26. *January:* Raw, cold, with snow.
    February: Bright, pleasant, cold weather.
    March: Windy, cold, with snow.
    April: Mostly pleasant; little rain; windy.
    May: Changeable weather, mostly warm.
    June: Quite changeable in temperature, and with frequent rains.
    July: Hot summer weather.
    August: Hot, early in the month quite dry.
    September: Bright, warm, cheerful weather, with rain.
    October: Early part of the month rainy, followed by bright warm days and cold nights.
    November: Dull, cloudy, cold weather, with snow and sleet.
    December: Mild, foggy, murky; very little frost.

I have not answered all of the questions, with opinions even; some it is unnecessary to write about, as answers are either understood in other questions or I have no opinions to offer.

Respectfully,

Grand Rapids, Kent Co., Oct. 7, 1878. ARTHUR HAZLEWOOD.

WESTERN DIVISION OF THE STATE.*

REPLIES BY E. N. DUNDASS, M. D., OF LUDINGTON, MICH.

1.† About twenty-six hundred (2,600).
2. About four per cent of deaths.
3. The whole city of Ludington.
4. About the same as previous years or less.
5. Average less.
6. It is impossible to give a statement without records to refer to. I cannot say that one disease was more prevalent or fatal in character than another.
7. —.
8. We have not had an epidemic of serious character in a year.
9. Neither too wet or too dry or too warm in the summer months, nor too cold in the winter months.
10. None.
11. —.
12. From diseases, malignant or otherwise.
13. Want of causes.
14. I have not sufficient records.
15. Nothing unusual.
16. We have had a few cases of scarlet fever, and a few cases of typho-malarial fever, but no cases of either of the other diseases mentioned. The cases above named were mild.
17. Small-pox, cholera, typhoid, measles, whooping-cough, cerebro-spinal meningitis, diphtheria.
18, 19, 20. —.
21. Good.
22. No.
23. Yes.
24, 25. No.
26. The seasons were regular and even.
27. I have not the records.
28. More particularly in August and September.
29. In November and December.
30. From three feet to seventy feet.
31. I cannot give the correct depth. It varies from one to eight feet.
32. In November and December.
33. In August and September.
34. —.

Yours respectfully,
Ludington, Mason Co., Feb. 20, 1878. E. N. DUNDASS, M. D.

REPLIES BY D. W. C. BURCH, M. D., OF ROCKFORD, MICH.

1.† Village. 1,300.
2. 7.
3. Village of Rockford.
4. Greater.
5. More.
6. Diphtheria.
7. Epidemic.
8. Typhoid fever.
9. Better treatment, and sanitary measures.
10. Diphtheria.
11. Malignant type.
12. Typho-malarial.
13. Sanitary regulations.
14. August to December 31,—high.
15. Diphtheria.
16. Diphtheria, 22; typhoid fever, 3.
17. Small-pox, cholera, scarlet fever, measles, whooping-cough, cerebro-spinal meningitis.

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*For counties in each division, see Exhibit 1, page 113.

†The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

18. *January:* Influenza, mumps, erysipelas, typho-malarial fever, and pneumonia.
February: Influenza, rheumatism, erysipelas, and typho-malarial fever.
March: Mumps, influenza, rheumatism, typho-malarial fever, intermittent fever, erysipelas.
April: Mumps, erysipelas, rheumatism, pneumonia, intermittent fever.
May: Intermittent fever, remittent fever, influenza, typho-malarial fever, pneumonia, rheumatism.
June: Intermittent fever, typho-malarial fever, erysipelas, pneumonia, rheumatism.
July: Diarrhea, dysentery, intermittent fever, typho-malarial fever, cholera morbus.
August: Intermittent fever, cholera morbus, cholera infantum, erysipelas, dysentery, typho-malarial fever.
September: Intermittent fever, typho-malarial fever, dysentery, diarrhœa, cholera morbus.
October: Intermittent fever, typho-malarial fever, influenza, diphtheria.
November: Diphtheria, intermittent fever, typho-malarial fever, erysipelas, whooping-cough.
December: Diphtheria, typho-malarial fever, rheumatism, whooping-cough, intermittent fever.
19. Cholera, among swine, in August and September.
20. Nothing of the kind occurred.
21. Good, first quality.
22. No.
23. Yes.
24. Usual.
25. Far less.
26. I can speak only from recollection, and that will be simply that nothing unusual occurred.
27. We had no very wet weather, and none very dry. The soil maintained an even tenor during the whole year.
28, 29. At no time.
30. 25 feet.
31. 25 feet.
32, 33. At no time.
34. Over-eating, cesspools, and privies.

The above is confined to the village of Rockford; my weekly reports are based on my general practice.

Respectfully yours,

Rockford, Kent Co., May, 1878. D. W. C. BURCH.

CENTRAL DIVISION OF THE STATE.*

REPLIES BY G. W. TOPPING, M. D., OF DE WITT, MICH.

1. I live in an unincorporated village. The population is 300.
2. Five.
3. For township of DeWitt, hereafter.
4. Less than average of last 6 years.
5. About the same.
6. Bronchitis and whooping-cough.
7. Whooping-cough was spread by contagion, derived from children attending the schools while laboring under the malady. Bronchitis was more prevalent than usual, owing to the great amount of rainfall and the irritable state of the bronchial mucous membranes following whooping-cough.
8. Consumption.
9. I have no theory to account for it; possibly the mildness of the Winter may have been favorable to consumptives.
10. No one in particular.
12. Pulmonary consumption.
13. Nothing in particular.
14. Nothing remarkable to state.
15. Whooping-cough from January 1 to April 21, 1877.

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* For counties in each division, see Exhibit 1, page 113.

16.* No cases of small-pox, cholera, measles, cerebro-spinal meningitis; 4 cases of diphtheria; 5 cases of typhoid fever; about 8 cases scarlatina, and probably 50 or more cases of whooping-cough (number estimated).

17. Small-pox, cholera, measles, cerebro-spinal meningitis.

18. *January:* Whooping-cough, bronchitis, pneumonia, rheumatism, consumption.
February: Whooping-cough, pneumonia, bronchitis, rheumatism, pharyngitis.
March: Whooping-cough, bronchitis, pneumonia, rheumatism, pharyngitis.
April: Pharyngitis, bronchitis, pneumonia, rheumatism, trachoma, whooping-cough.
May: Pharyngitis, remittent fever, intermittent fever, constipation, diphtheria, consumption, rheumatism, trachoma.
June: Remittent fever, intermittent fever, leucorrhea, bronchitis, constipation, abortion, trachoma, sciatica, fractures of femur and clavicle, diabetes, endo-metritis, asthma, incised wounds, tinea tonsurans, amenorrhea, dropsy, puerperal fever, dysmenorrhea, mammary abscess, cerebral hyperemia, dysentery.
July: Remittent fever, intermittent fever, diarrhea, diabetes, trachoma, endometritis, nettle-rash, dropsy, acne, fractures (femur and clavicle), typho-malarial fever, scrofulous ulcers, abortion, renal ischuria, hæmaturia, bronchitis.
August: Remittent fever, intermittent fever, diarrhea, dysentery, typho-malarial fever, trachoma, hæmaturia, stomatitis, goitre, diabetes, dropsy, hysteria, gonorrhœa, dislocations (jaw and elbow), typhoid fever.
September: Remittent fever, intermittent fever, diarrhea, dysentery, typhoid fever, typho-malarial fever, diabetes, thrush, dropsy, asthma, colic, chorea, scrofula, atrophy, aphonia, sciatica, follicular stomatitis, gonorrhea.
October: Remittent fever, intermittent fever, diarrhea, typhoid fever, bronchitis, rheumatism, pharyngitis, colic, diabetes, dropsy, asthma, chorea, tinea tonsurans, goitre, nettle-rash, retroversion of the uturus, hysteralgia, neuralgia, fracture of arm.
November: Typhoid fever, intermittent fever, remittent fever, pharyngitis, bronchitis, diarrhea, neuralgia, dysentery, rheumatism, gonorrhea, apoplexy, fracture of forearm, rupture of perineum, paronychia, infantile convulsions, dysuria, pleurisy, contusion of foot, fracture of jaw, lymphatitis, epilepsy, dropsy.
December: Pharyngitis, bronchitis, rheumatism, typhoid fever, intermittent fever, leucorrhea, pneumonia, remittent fever, scrofulosis, waxy liver, occlusion male urethra, wound of foot, fracture of jaw, fracture of radius, ovarian tumor, jaundice, abortion, colic, diphtheria, dysentery, scrofulous abcesses.

19. Many horses had distemper and epizooty, in November and December.

20. I cannot say, but think they were generally free from disease.

21. I cannot say.

25. I think there was more hay than usual injured by the wet weather.

26, 27. I cannot.

28. It was driest in August.

29. In July, October, and November.

30. In the village of DeWitt it is from 20 ft. to 45 ft., according to situation; in some parts of the township, much less; generally, about here, the wells go about down to the level of the Looking Glass River for permanent water.

31. Our wells in the village generally vary but little in depth at different seasons of the year. A few wells are affected by surface water, and rise in March and April, but to very different extent, according to situation.

32. A little higher than usual, in October and November.

33. None.

De Witt, Clinton Co., March, 1878. G. W. TOPPING, M. D.

REPLIES BY A. P. DRAKE, M. D., OF HASTINGS, MICH.

1.* 2,500.

2. Not to exceed 10.

3. City and six miles in every direction.

4. It was the same as the average.

5. About the average.

6, 8, 10, 12, 14, 15. About the ordinary average.

16. Cannot.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

17. No small-pox, cholera, scarlet fever, measles; but very few, if any, cases of the others, except whooping-cough, which has been quite prevalent.
18. I cannot.
19. A limited number of cases called by horse-men spinal meningitis, among horses.
20, 21. First quality.
22. No.
23. Yes.
24. No, not at all.
25. In perfectly good order.
26, 27, 28, 29. I have no record.
30. From 20 to 45 feet.
31. Very little, if any, change.
32, 33. No extreme changes for 1877.

Respectfully yours,
Hastings, Barry Co., March 12, 1878. A. P. DRAKE, M. D.

REPLIES BY C. V. BEEBE, M. D., OF HOWELL, MICH.

1.* Village with about 2,700 inhabitants.
2. About 8 or 10.
3. Village of Howell, townships of Howell, Genoa, Oceola, Marion, and Iosco.
4, 5. About same, a little less of the two.
6. In Oceola, dysentery.
7. I cannot.
8. I cannot say.
9. —.
10. Dysentery, chronic diseases, and pulmonary consumption.
11. —.
12. I do not know.
13. —.
14. In the month of August there was a high rate of mortality in the town of Oceola, from dysentery.
15. In April, May, and December, puerperal fever. Small amount of scarlet fever.
16. No typical case of typhoid fever, but many complicated ones. Perhaps one-half dozen cases of scarlet fever, one case true diphtheria, a few cases reported of cerebro-spinal meningitis. The authority was not reliable. One case of whooping-cough.
17. Small-pox, cholera, measles.
18. *April:* Rheumatism, 1; bronchitis, 2; consumption, 3; intermittent fever, 4; influenza, 5; puerperal fever, 6.
May: Intermittent fever, 1; influenza, 2; rheumatism, 3; bronchitis, 4; puerperal fever, 5; consumption, 6.
June: Intermittent fever, 1; rheumatism, 2; remittent fever, 3; influenza, 4; consumption, 5; typho-malarial fever, 6; whooping-cough, 7.
July: Intermittent fever, 1; remittent fever, 2; typho-malarial fever, 3; rheumatism, 4; diarrhea, 4; consumption, 5; bronchitis, 6.
August: Diarrhea, 1; dysentery, 2; intermittent fever, 2; typho-malarial fever, 3; rheumatism, 4; bronchitis, 5; consumption, 6.
September: Intermittent fever, 1; diarrhea, 2; dysentery, 3; remittent fever, 4; influenza, 5; typho-malarial fever, 6; rheumatism, 7; erysipelas, 8.
October: Intermittent fever, 1; remittent fever, 2; diarrhea, 3; typho-malarial fever, 3; dysentery, 4; influenza, 5; bronchitis, 5; rheumatism, 6; consumption, 7; diphtheria, 8; erysipelas, 8.
November: Intermittent fever, 1; remittent fever, 2; influenza, 3; diarrhea, 4; typho-malarial fever, 5; bronchitis, 6; consumption, 7; scarlet fever, 8; diphtheria, 9; whooping-cough, 10.
December: Influenza, 1; intermittent fever, 2; remittent fever, 3; rheumatism, 4; bronchitis, 5; consumption, 6; typho-malarial fever, 7; pneumonia, 8; puerperal fever, 9.
My observations from this point commenced the last week in April.
19. I do not know.
20. None.
21. Good.
22. No.
23. Yes.
24, 25. Less.

26.* May was quite pleasant, with warm rains; a little cold the last week, but it did not freeze.

June, first half was cool and pleasant; the last half was warm, with showers.

July, first part was warm and dry; latter part was cooler, with an occasional shower.

August, first part was warm and dry; the last half was warm, with occasional showers.

September, first part was warm, with heavy rainfall; last part was warm and dry.

October, rainy and cool.

November, first week was fine; second week snowed the fore part and rained the latter part; third week, snow and rain; fourth week variable.

December, changeable.

27. See answer 26.

28, 29. Not having resided here previously to 1877, I cannot tell.

30. Generally about 40 feet.

31, 32, 33. I do not know.

Some of the above questions are quite difficult to answer, and I have answered approximately. Hoping this may prove satisfactory, I remain

Very truly yours,

Howell, Livingston Co., Feb. 21, 1878. C. V. BEEBE, M. D.

REPLIES BY O. E. HERRICK, M. D., OF GREENVILLE, MICH.

1.* About 3,000.

2. About 40 have died.

3. City of Greenville with a radius of 10 miles.

4. Less.

5. Less by perhaps 5 per cent.

6. Diphtheria and cholera infantum.

7. The only cause I can assign is improper sewerage, nearness of cesspools and privies to wells, and lack of care by city authorities to have refuse matter taken care of.

8. Malarial diseases.

9. To the country being in a more improved condition; also to the fact that farmers are giving more of their attention to the raising of stock, and consequently are doing less plowing than heretofore.

10. Diphtheria, cholera infantum, and consumption.

11. I cannot.

12. All other diseases.

13. Answered in No. 9.

14. Diphtheria from Nov. 10 to Dec. 31; about nine-tenths were fatal; consumption from Oct. 1 to Dec. 15, with a high rate of mortality; cholera infantum from July 1 to September 15, with less mortality than usual.

15. Diphtheria has not usually occurred in this locality. It occurred from Nov. 10 until Dec. 31.

16. Of scarlet fever, 5 or 6 cases; of whooping-cough, 8 or 10 cases; of diphtheria, 25 or 30 cases; of typhoid fever, 4 cases.

17. Small-pox, cholera, measles, cerebro-spinal meningitis.

18, 19. I have no means of ascertaining.

20. I do not know, except that hay was mouldy.

21. I think they were all dry and in good condition, except corn; that in this locality was mouldy and wet.

22. Corn was badly affected. I do not know about the rest.

23. I think not, as large quantities were threshed in the fields.

24. I am told that it does.

25. More.

26. I have no means of knowing.

27. I cannot tell exactly; but taken as a whole, it has been a wet year.

28, 29. I cannot tell.

30. 25 feet.

31. I cannot tell exactly, but it was higher than usual all the year.

32. It was unusually high all the year; it was lowest during the summer months.

33. It was not unusually low in any month of the year.

34. I have nothing to offer.

You ask for any suggestions I may feel inclined to make, concerning methods for the prevention of sickness or deaths, in our State. As stated in my last year's report, the law should be enforced in regard to the throwing of sawdust into our streams or carting it in large quantities out on the land to rot and generate foul gases. *It should be burned.* Nearly all the rivers in the northern portion of the State are already one-half filled up with sawdust now, and the mills are constantly adding to it. Every Spring large tracts of bottom lands are covered over with it to the depth of from two to four inches; the consequences cannot be otherwise than pernicious.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

Another matter of great importance to the people is the want of proper sewerage in all our small cities, in most of which the simple lay of the land is all there is; a few have stone gutters; almost none, under-ground pipes. While if one looks in the back alleys in the rear of business houses on the business streets, he will find a sight to behold. Privies and wells are thickly strewn along without regard to their proximity. Many are not 10 feet apart, and 20 feet is the maximum distance; while the alleys are strewn to the depth of from two inches to a foot with all kinds of decaying vegetable and even animal matter. I have good reason to believe that if the city authorities would abate these nuisances it would have a great influence on the health of its people. As for the sawdust, the law cannot be too strictly enforced; as it is not only very dangerous to the public health, but it is also killing all the fish in our streams.

Greenville, Montcalm Co., Feb. 23, 1878. O. E. HERRICK. M. D.

REPLIES BY A. W. NICHOLSON, M. D., OF OTISVILLE, MICH.

1.* The village of Otisville has a population of about 500.

2. I estimate the number of deaths at eight.

3. A radius of eight miles from the village of Otisville, including the whole of the township of Forest, and part of Thetford and Richfield.

4. In this locality, the amount of sickness was less, by about one-third.

5. About the same as the average.

6. Diphtheria and typhoid fever were more than usually prevalent during 1877, and the mortality from both was greater than usual.

7. I believe that atmospheric conditions greatly affected the prevalence of these diseases; but I am not positive as to any precise relations.

8. Intermittent and remittent fevers, diarrhea, and entero-colitis were less than usually prevalent.

9. Principally to improved sanitary surroundings.

10. Diphtheria and typhoid fever.

11. I cannot, unless it be the unsanitary surroundings which, with nearly all the cases, were known to exist.

12. The mortality was less than usual in intermittent and remittent fevers, and in pulmonary diseases.

13. To atmospheric conditions generally, not unfavorably influenced by local conditions.

14. Diphtheria, in the month of December,—the rate of mortality being higher, there being a greater prevalence of the disease in that month.

15. Diphtheria, in the month of December.

16. Ten cases of diphtheria, and eight of typhoid fever.

17. None of the other cases mentioned occurred in this locality during 1877.

18. *January:* Bronchitis.
February: Bronchitis, pneumonia.
March: Bronchitis, pneumonia, erysipelas.
April: Intermittent fever, bronchitis, erysipelas.
May: Intermittent fever, bronchitis, pneumonia, rheumatism.
June: Intermittent fever, diarrhœa, remittent fever, pneumonia.
July: Intermittent fever, diarrhœa, cholera morbus, remittent fever, erysipelas, rheumatism.
August: Intermittent fever, diarrhea, cholera morbus, remittent fever, erysipelas, rheumatism, bronchitis.
September: Intermittent fever, remittent fever, diarrhœa, typhoid fever, cholera morbus, rheumatism, bronchitis.
October: Intermittent fever, diarrhœa, influenza, bronchitis, remittent fever.
November: Intermittent fever, bronchitis, diarrhœa, rheumatism.
December: Bronchitis, intermittent fever, diphtheria, rheumatism.

19. I know of none prevailing.

20. The crops were generally excellent.

21.* The condition was good.
22. I know of none so affected.
33. Generally so.
24, 25. Less.
26. My meteorological data are only reported from the first of May, the following table being a summary of the same. The months of January and February were cold and open; there was considerable snow in March.

Meteorological Conditions at Otisville, Genesee Co., Michigan,—May to December, 1877.

MONTHS, 1877.	TEMPERATURE,—F.		BAROMETER.ª	PREVAILING WINDS.	Cloudiness less than 50 per cent.	OZONE. Average.		RAIN.	SNOW.
	Lowest.	Highest.	Average.		Days.	Day.	Night.	Inches.	Inches.
May	30	88	....	Northerly	12	3.5	2.7	1.78	Light fall.
June	43	90	29.068	Southerly	18	3.0	2.7	4.17	
July	44	96	29.084	Westerly	15	3.0	1.9	1.97	
August	42	95	29.066	Westerly	15	3.4	1.8	3.58	
September	34.5	86	29.153	Southerly	12	3.1	1.9	2.59	
October	25	89	29.114	Westerly	10	3.4	3.2	4.33	
November	10	61	29.143	Westerly	8	4.6	5.2	3.03	About 6.
December	9	64	29.244	Southerly	8	3.4	3.9	1.68	2.

ª Reduced to 32° F.

27. October, June, August, November, September, July, April, May, December, March, February, January.
28, 29. There was an unusual amount of moisture in the soil all the year.
30. Five to ten feet from surface of ground to water in wells.
31. Lower in the early months than in the succeeding months. I have no exact evidence as to the depth of earth above the ground water each month of the year; but I would think that, taking the usual depth at from five to ten feet, it would vary in proportion to the amount of rainfall in each month, as expressed in the above table.
32, 33. Unusually high all the year.
34. I believe coëxisting increased barometic pressure and diminished quantity of active oxygen to greatly influence increase of sickness.

I can give no illustrations of the communicability of disease better than those contained in my report relative to scarlet fever, sent you last year.†

Otisville, Genesee Co., Feb. 25, 1878. A. W. NICHOLSON.

REPLIES BY O. B. CAMPBELL, M. D., OF OVID, MICH.

1.* Incorporated village of Ovid, 1,500 inhabitants.
2. From 25 to 30, village and surrounding country included.
3. Answered above.
4. Less, by one-eighth.
5. About the same.
6. None.
7 to 11. —.
12. Scarlet fever.
13. Our cases were nearly all of the simple variety.
14. Scarlatina commenced in September, and has continued ever since with low mortality.
15. None.
16. Sixty cases of scarlatina, twenty cases of whooping-cough, three cases of typhoid fever.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.
† [Printed on pages 417-418 of the Fifth Annual Report.—H. B. B., Sec'y.]

17. All excluded except scarlatina, whooping-cough, and typhoid fever.
21. Wheat and hay were secured in as good condition as usual.

Regretting that my short acquaintance here excludes positive knowledge in regard to the balance of the questions, I respectfully submit my report.

Yours truly,

Ovid, Clinton Co., Feb. 20, 1878. O. B. CAMPBELL, M. D.

REPLIES BY G. E. CORBIN, M. D., OF ST. JOHNS, MICH.

1.* The population of this village is 3,000.

2. The total number interred in our cemetery during the year 1877 was five. Two of these resided in the country. One died of old age (78) and the other of paralysis, at the age of 62. I do not remember, and after considerable inquiry do not get information, that more than three died during the year 1877 from our population of 3,000. Of these, one was an infant 7 months of age; one was killed by the cars; and one died of kidney difficulty, of long standing.

4. Evidently less.

9. On this question I have no well-settled opinion.

16. Very little of the difficulties named.

17. Small-pox, cholera, cerebro-spinal meningitis.

19. I cannot state. Think there was nothing of the kind that attracted especial attention.

20. Nothing of the kind came under my knowledge.

21. Very fine.

23. Yes.

30. From 12 to 30 feet.

31. Our well-water is found in quicksand, over which is a stratum of clay from 10 to 20 feet in thickness. The height of the water in the quicksand does not vary to the extent of one foot, usually, during the entire year, whether we have much or little rainfall.

34. The only thing we have now, in this locality, especially adapted to the production of sickness, is our public school with its greatly overcrowded rooms and insufficient ventilation. Cases of catarrh, influenza, and pneumonia, in considerable numbers, at some seasons of the year, are directly traceable to these causes; and the amount of injury thus inflicted in the way of a general depression of the vital forces of the children, can never be accurately estimated. That the general average duration of life is thus shortened is unquestionable.

[The remaining paragraphs of Dr. Corbin's replies together with permission to insert them as a part of his reply to the circular, were received from him in answer to the following suggestion from the Secretary, relative to answers 2 and 31:

"I think your small death-rate must have some connection with the water-supply being protected from contamination, by from '10 to 20' feet of clay over it. I hope great precaution will be observed that no one lets surface contaminations down through the protecting cover into your water-supply, as might be done by placing a privy in such relation to a well as that the contents of the privy should find its way into the constant [and general] supply, by way of the single well near by and in unfortunate relation to such privy."

Nothing could better show the need of such precaution, and the necessity for constant vigilance, and prompt, fearless, and decisive action by local boards of health throughout the State, than the facts stated by Dr. Corbin. If such foolish experiments in sewerage involved only the loss to the individual making them of the cost of a good well, it may be that many individuals throughout the State could afford to make them; but when it is considered that they endanger the water-supply and the health of a whole city or village; and that many may suffer who are innocent and ignorant of the folly from which they suffer, it will be seen that the Legislature has wisely conferred on local boards of health discretionary power in protecting the health of the people.

Such experiments also illustrate the importance and the economy of making and publishing the sanitary survey of the State, the need for which is so plainly stated by Dr. Kedzie, the President of this Board, on pages 9 and 10 of this Report.—H. B. B., Sec'y.]

I have had some fears that our water-supply, which is now of excellent quality, may be contaminated in the future by, or through, ignorance and heedlessness. Already the attempt has been made, and by men of wealth and prominence in official positions, which facts certainly should imply a greater degree of intelligence, to *drain both privies and kitchen-slops* directly into the quicksand which now affords our water-supply.

The experiments with the kitchen-slops were such as to abate my fears in that direction. Not so with the privies. Cesspools were connected with the quicksand by boring a hole six or eight inches in diameter down through the superincumbent clay. A number of large and somewhat expensive cesspools were thus constructed here several years ago, but, fortunately, they would not answer the purpose intended, and they had to be taken up. The grease of the kitchen-slops seemed to coat over the quicksand, and in a little time so effectually retain the contents of the cesspools, that the stench from putrefaction compelled their removal.

I fear that the contents of the privy-vault, however, is not so self-protecting. A prominent citizen here now who connected his privy-vault with the quicksand by boring through the clay, is now bringing his well-water from a neighbor's well, his own not being fit to use. I cannot now state why his well-water is impure, but I will endeavor to ascertain and make a note of the fact.

I dislike to deal in personalities, nevertheless I thought best to mention these cases, as showing that wealth, culture, and high official position do not necessarily imply a knowledge of the very plainest laws of health. You can also the better appreciate the *magnitude* of the work on which you are engaged.

Very truly,

St. Johns, Clinton Co., July 3, 1878. G. E. CORBIN.

BAY AND EASTERN DIVISION OF THE STATE.*

REPLIES BY W. R. MARSH, M. D., OF BAY CITY, MICH.

1.† About 14,000 or 15,000.
2. —.
3. The corporate limits of Bay City.
4. I think it was 10 per cent less than in 1876.
5. No. 4 will answer for this.
6. Small-pox. Others were less prevalent.
7. Contagion for small-pox.
8. Croup and diphtheria.
9. Drainage, and general improvement of ground.
10. I do not think there was any disease more prevalent, except small-pox.
11. Contagion.
12. Fevers generally were not as fatal.
13. Better drainage and good water-supply.
14. March, April, and May, small-pox—high, 33 per cent.
15. No. 14 answers this.
16. I have no figures to give a correct answer.
17. Cholera.
18. I cannot do it.
19. I know of none. There were some accidental cases of course.
20. I think none. The city would not know.
21. All were good, as I am informed.
22. I think not.
23. It was, and it was good.
24. It was dry and in good condition; no "banking".
25. It was dry and not mouldy.
26. I cannot do it. There is no meteorological station in our city.

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* For counties in each division, see Exhibit 1, page 113.

† The figures beginning paragraphs refer to questions in Circular 24, on pages 103-9 of this Report.

27. May and June were dry; November and December were very wet, although we had no special drouth; it was a moist season.

28, 29. No. 27 will answer for 28 and 29. None was very dry.

30. It is from 10 to 15 feet. Our town is almost uniform in surface. The water is almost entirely surface water; if this surface water is passed there is a long distance down to water, as is noticed in boring for salt water. After passing the dense ground that holds the surface water, drilling is slow for 300 or 400 feet and sometimes more. We are having sewers and drains constructed that must make our ground much healthier than in early years of the settlement. All our water for household purposes comes from the bay and ought to be good. I do not know whether there has been found in it much that is inconsistent with the health of those who use it.

Very respectfully,

Bay City, Bay Co., Feb. 25, 1878. WILLIAM R. MARSH.

REPLIES BY NELSON H. CLAFLIN, M. D., OF EAST SAGINAW, MICH.

1.* 17,000.
2. —.
3. City of East Saginaw.
4, 5. About as average.
6. None.
7. —.
8. Diphtheria and scarlatina.
9. I can give no reason.
10, None.
11. —.
12. I know of none.
14. I cannot answer.
15. There was none.
16. Have no way of knowing.
17. Cerebro-spinal meningitis, small-pox, cholera, typhoid fever.
18. I cannot.
19. None.
20. I do not know.
21. Good.
22. No.
23. Yes.
24. I do not know.
25. About as usual.
26, 27, 28, 29. I cannot answer.
30. 1 to 3 feet.
31, 32, 33. I cannot answer.

Yours truly,

East Saginaw, Saginaw Co., May 20, 1878. NELSON H. CLAFLIN, M. D.

REPLIES BY SAMUEL KITCHEN, M. D., OF EAST SAGINAW, MICH.

1.* City.

2. There were 164 interments, according to the report of the sexton of Brady Hill cemetery to the common council. This does not include the interments at the Catholic cemetery; I cannot get those.

3. The city of East Saginaw, Michigan.

4. Less.

5. Less. In 1876 there were 179 interments; in 1877, 164 interments,—according to the report of the sexton of Brady Hill cemetery to the common council.

6. Consumption.

7. —.

8. All except consumption.

9. Less intemperance both of eating and drinking, less hard labor, and consequently less exposure.

10. Consumption.

11. Cold, damp, and unseasonable weather.

12. All others.

13. To causes named in No. 9.

14.* The last quarter of 1877.
15. —.
16. Of scarlet fever, a few cases; of whooping-cough, a few cases; of diphtheria, 2 fatal cases,—(facts); considerable malarial fever of all types, very few, if any, fatal cases,—(opinion).
17. Nearly all but those mentioned in No. 16.
18. I cannot answer.
19. None that I am aware of.
20. None known.
21. Good.
22. No.
23. I think not.
24. I don't know.
25. It was not affected by wet.
26. June was probably the only really dry month.
27. June was the driest; the rest were about alike.
28, 29. Soil is always damp.
30. One foot, probably.
31, 32, 33. I cannot answer.
34. —.

Yours,

East Saginaw, Saginaw Co., Feb. 14, 1878. **SAM'L KITCHEN, M. D.**

REPLIES BY A. M. OLDFIELD, M. D., OF LEXINGTON, MICH.

1.* 1,000.
2. Seven.
3. The village, being one mile north and south, three-fourths mile east and west.
4, 5. The same as the average.
16. Some whooping-cough the first of year, a few cases of malarial diseases, 1 case of hay fever, some influenza, 3 or 4 cases of dysentery, two mild cases of erysipelas, some venereal diseases.
17. Small-pox, cholera, scarlet fever, typhoid fever, measles, cerebro-spinal meningitis, diphtheria.
27. I cannot, for each month.
29. During the last half of the year.
30. Eight feet.

Lexington, Sanilac Co., March 27, 1878. **A. M. OLDFIELD.**

REPLIES BY N. D. LEE, M. D., OF SAGINAW CITY, MICH.

1.* City,—ten thousand five hundred inhabitants.
2. One hundred and forty.
3. City of Saginaw, Mich.
4, 5. Greater—nearly 23 per cent.
6. Cholera infantum, pulmonary consumption, dysentery, pneumonia, still-births, and deaths of very young children—disease not known.
7. Hard times among the poor.
8. Scarlatina, pleurisy, liver complaints, fits, malarial fevers, and diphtheria.
9. I cannot say certainly.
10. See answer to question 6. I send the registered list of diseases and deaths for the years 1875, 1876, and 1877.
11. See answer to question 7.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

TABULAR STATEMENT (*nearly correct*) *of the Diseases that have Caused Death, and of the Number of Deaths in the City of Saginaw, Mich., in the Years 1875, 1876, and 1877,—made by Dr. N. D. Lee, M. D., City Physician and Acting Health Officer for the Years 1876 and 1877.* (*Population in 1877,—10,500.*)

DISEASES, AS RECORDED IN REGISTER.	DEATHS.			
	1875.	1876.	1877.	Total.
Accidents	9	6	5	20
Abscess of Bowels	......	......	1	1
Bifid Spine	......	......	1	1
Bowels, Inflammation of	3	3	6	12
Brain, Congestion of	1	......	2	3
Brain, Softening of	......	......	1	1
Bright's Disease	......	1	......	1
Cancer	1	1	1	3
Catarrh	1	......	......	1
Childbirth	......	2	......	2
Cholera Infantum	8	4	14	26
Cholera Morbus	......	......	4	4
Consumpt'n, Pulmonary	13	11	20	44
Cramps	4	......	4	8
Croup	1	......	......	1
Cyanosis	......	......	1	1
Cerebro-spinal Meningitis	8	5	4	17
Diarrhea	17	12	......	29
Diphtheria	1	......	......	1
Dropsy	......	2	1	3
Dysentery	4	......	8	12
Erysipelas	......	......	3	3
Fever, Intermittent or Malarial	3	6	......	9
Fever, Typhoid (Enteric) and, I presume, Typho-malarial	......	2	4	6
Fever, Typhus	1	......	......	1
Fits	2	4	......	6
Gravel	......	......	1	1
Heart Disease, result of Rheumatism in nearly all cases here	2	3	3	8
Hemorrhage	......	......	1	1
Liver Complaint	......	4	......	4
Lungs, Congestion of	4	2	......	6
Old Age	3	1	7	11
Pleurisy	2	......	......	2
Pneumonia	4	7	9	20
Pneumonia, Typhoid	......	......	3	3
Premature Birth	......	......	1	1
Rheumatism	2	......	2	4
Scarlatina	2	4	......	6
Still-born	11	11	13	35
Suicide	......	1	1	2
Sore Mouth	......	......	1	1
Teething, probably Diarrhea	......	2	3	5
Unknown, generally very young children	9	13	15	37
Whooping-cough	2	5	......	7
Totals	118	112	140	370

12. See answer to question 8, and also Tabular Statement above.
13. I cannot say certainly.
14. August, September, and July for bowel complaints; winter months for lung diseases, in order, March, December, February, January, and November,—with higher rate of mortality than usual.
15. None.
16. Of scarlet fever, about 12; of typhoid fever, about 6; of cerebro-spinal meningitis, about 3; of diphtheria, about 15.
17. There were no cases of small-pox, cholera, measles, whooping-cough, that I have heard of, and no deaths from these diseases reported.
18. I cannot, correctly.
19. None.
20. None, except potato bugs and blight on fruit trees.
21. Good.
22. Not that I have heard of.
23. Yes.
24, 25. Less.
26. I cannot.

27.* I cannot exactly now.
28, 29. About as usual.
30. From 2 feet to 5 or 6 feet; all about the same where there are no sewers.
31. About as answered above.
32, 33. About as usual.
34. Malarial poison, surface water, sewage, barn and privy poisons.

If we had a law compelling every one that has charge of a cemetery to keep a register of the name, age, birth-place, place of death, and cause of death of every person buried, and of what physician was in attendance, and in cities where there are more cemeteries than one requiring the name of the person to be buried to be registered with some officer of the city, with the necessary descriptions, and not allowing any one to be moved except on presentation of a certificate from such registrar,—then we could get at some of the matters easily.

Yours truly,

Saginaw City, Saginaw Co., Dec. 31, 1878. N. D. LEE, M. D.

REPLIES BY JOHN S. CAULKINS, M. D., OF THORNVILLE, MICH.

3.* The township of Dryden and contiguous parts of Lapeer, Attica, and Metamora townships, Lapeer Co.
4. The year 1877 was a healthy one, the amount of sickness being considerably,—perhaps 20 per cent,—less than the average rate.
5. Less, by about 25 per cent.
6. None.
7. —.
8. The whole class of bilious or malarious diseases was less than usually prevalent.
9. The lessened prevalence can mainly be attributed to improved drainage of the country.
10. None.
11. —.
12, 13, 14. The rate of mortality as proportioned to rate of disease (not population) in 1877 was about an average with other years.
15. There were no such.
16. Of scarlet fever, 6 cases, 2 fatal; of typhoid fever, 20 cases, 2 fatal,—these cases, or the most of them, would more properly be classified under the head of typho-malarial; of diphtheria, 5 serious cases, none fatal; of whooping-cough, it would not be easy to estimate closely the number of cases; but probably 300 would not be too high.
17. Small-pox, cholera, and cerebro-spinal meningitis.
18. *January:* Influenza, pneumonia, bronchitis, diarrhea, diphtheria, rheumatism, fevers, etc.
February: Like January, but more pneumonia.
March: Influenza, bronchitis, intermittent fever, pneumonia, and rheumatism.
April: Like March, with the addition of diarrhea and scarlet fever.
May: Intermittent fever, bronchitis and influenza, diarrhea, pneumonia, measles, diphtheria, and rheumatism.
June: Like May, with a little scarlet fever.
July: Whooping-cough, intermittent fever, bronchitis, cholera morbus, and diarrhea.
August: Like July.
September: Intermittent fever, diarrhea, dysentery, cholera morbus, and cholera infantum.
October: Intermittent fever, diarrhea, typho-malarial fever, remittent fever, bronchitis, and rheumatism.
November: Like October, with a little diphtheria and typhoid fever.
December: Intermittent fever, typho-malarial fever, bronchitis, and pneumonia.
19. There has been some disease or distemper among horses during the latter part of the year. Last Summer the roup was quite fatal to the chickens. The sheep and cattle seem to have been more than commonly well. It is frequently remarked concerning the splendid manner in which they have come through the Winter of 1877-8.
20. The potatoes have rotted in the cellar to a considerable extent.
21. Prime, except a part of the wheat, that part which was stacked out of doors and threshed too soon after the heavy August rains.
22. No.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

23. As before stated, a part of the wheat, roughly estimated at one-third, was threshed in a wet or damp state.

24. A greater proportion, that is to say, that part which was threshed before the stacks became dry.

25. Certainly not more than usual,—the quality of the crop was excellent.

26. *Summary, for the year 1877, of Meteorological Conditions, at Thornville, Michigan.*

YEAR AND MONTHS, 1877.	TEMPERATURE,—Degrees F.				INCHES OF RAIN AND MELTED SNOW.	SUNSHINE.			REMARKS.
	Highest.	Lowest.	Range.	Average.		Hours.	Clear Days.	Cloudy Days.	
YEAR..	93	-10	103	46.86	31.48	2,520	117	84	....
Jan.......	43	-2	45	19.23	2.	136	4	9	Cloudy, moderately cold and moist; sleighing the last half.
Feb.......	50	16	34	31.07	0.	175	12	4	Dry, warm, and pleasant; no rain or snow.
March...	44	-10	54	25.48	4.67	132	6	11	Wet, stormy, and cloudy; coldest day of the year, the 17th,—-10°
April....	76	18	58	44.50	2.75	231	15	8	Pleasant and rather dry.
May.....	90	30	60	46.94	1.69	317	15	0	Dry; no entirely cloudy days.
June.....	87	36	51	67.20	2.06	297	9	2	Pleasant and rather dry; heavy frost the 21st.
July.....	92	48	44	72.26	1.78	333	11	1	Hot, sunny, and dry; only one entirely cloudy day.
August..	93	48	45	70.42	7.19	289	11	5	Hot and moist; much thunder; excessively wet.
Sept.....	83	42	41	63.57	1.31	267	15	2	Dry.
Oct......	83	31	52	50.	4.67	126	6	13	Unusually cloudy and gloomy.
Nov......	59	17	42	45.37	1.53	93	7	18	Very cloudy and gloomy.
Dec......	46	0	46	26.74	1.83	124	6	11	

27. February, July, June, May, January, December, April, November, September, October, March, August.

28. February.

29. August and September.

30. From 20 to 100 feet.

31. This question cannot be satisfactorily answered, for want of necessary observation.

32. August and September, first half.

33. July and February.

Thornville, Lapeer Co., March, 1878. JOHN S. CAULKINS.

SOUTH-WESTERN DIVISION OF THE STATE.*

REPLIES BY H. S. LAY, M. D., OF ALLEGAN, MICH.

1. Two thousand in the village of Allegan.
2. Twenty-eight in the village of Allegan.
3. Allegan township and village.
4. In my opinion it was diminished about 25 per cent.
5. Probably diminished about 10 per cent.
6. None.
7. —.
8. Zymotic and malarial diseases.
9. Better water-supply and improved general sanitary conditions.
10. None.

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*For counties in each division, see Exhibit 1, page 113.

11.* —.
12. Zymotic.
13. To better water-supply and improved general sanitary conditions.
14. There have been no diseases prevailing to any extent during the year that have been attended with either an unusually high or low degree of mortality.
15. There was no occurrence of any.
16. Of scarlet fever, 6; of measles, 1; of whooping-cough, 1; of cerebro-spinal meningitis, 2.
17. Small-pox, cholera, typhoid fever, and diphtheria.
18. —.
19. None worth mentioning.
20. None.
21. Good.
22. No.
23. Yes.
24. It did not last year, and does not usually, bank in bin.
25. About the average.
26. I am unable to do so, for want of data.
27. I cannot.
28, 29. At no time.
30. Twenty-five feet.
31. I am unable to do so.
32, 33. In no months.
34. In my opinion, one of the most fruitful sources of disease in this locality is the bad privy arrangements. It is very difficult to make local boards of health realize the magnitude of the evil; yet some advancement has been made in this direction during the past year.

Yours respectfully,

Allegan, Allegan Co., March, 1878. H. S. LAY.

REPLIES BY J. E. FERGUSON, M. D., OF BANGOR, MICH.

1.* Twelve hundred in village.
2. Between 15 and 20. I think not more than 15.
3. Bangor village, 1¼ miles square.
4. Less, by about 50 per cent, than for 3 or 4 years.
5. Less, but not in proportion to decrease in sickness.
6. None.
8. Fevers of a typho-malarial nature.
9. To better drainage and more even temperature.
10. Not any.
12. Fevers of a malignant type.
13. Mainly to lessened number of cases.
14. Scarlatina of a very mild type in Fall and Winter months.
15. Not any.
16. The reply to this question I can only guess. Of scarlet fever, perhaps as many as 50 cases, and only one death. True typhoid fever is very rare here; we have typho-malarial fever whenever it is of a malignant character. A little whooping-cough and a few cases of diphtheria.
17. Small-pox, cholera, measles, cerebro-spinal meningitis.
18. Pneumonia, in Winter months; ague, in Summer; scarlet fever and malarial diseases, in latter part of Summer and Fall.
19. Some hog cholera, in the Summer and Fall.
20. I know of none.
21. Very fine; all in splendid condition.
22. I heard no complaint among farmers.
23. It was, in most cases.
24. Less, as it was better dried.
25. In good condition.
26. I have no means of knowing how to answer this.
27. July, August, June, September, May, October. The others were all moist.
28. It was not unusually dry at any time.
29. Rather more rain in August and September than the average of years.

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*The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

30. From 20 to 30 feet, and that is about the variation.
31. I cannot say.
32. In Spring and Fall, but no more than in other years.
33. At no time.

In the absence of records, the greater part is necessarily based on judgment alone.

The great fires in the Fall when Chicago was burned raged all through this region and burned out all our swamps, letting in the sun next year, and causing an unusual amount of disease of a malarial origin; but for the last three or four years it has been growing more healthy, partly from the clearing up of the country, but mostly from the draining and improving of the low lands.

Yours very truly,

Bangor, Van Buren Co., March 2, 1878. J. E. FERGUSON, M. D.

REPLIES BY T. H. BRIGGS, M. D., OF MATTAWAN, MICH.

1.* Five hundred.
2. Three.
3. For a part of the townships of Antwerp, Almena, and Porter, of Van Buren county, and also portions of the townships of Texas and Oshtemo, Kalamazoo county.
4. Less than previous years, one-half.
5. One-third less.
6. Myelitis.
7. I cannot assign any cause for the unusual prevalence of the above.
8. All diseases influenced by malarial forms.
9. Dryness of the soil.
10. Myelitis only.
11. I cannot.
12. Malarial complications.
13. Dryness of the soil.
14. Less, throughout the year.
15. No observations.
16. Of scarlet fever, about 25; of diphtheria, 2.
17. Small-pox, cholera, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis.
18. I believe first would be rheumatism, next intermittent and remittent fevers, scarlet fever, pulmonary consumption, myelitis, and many others that I cannot now mention.
19. I observed none.
20. None.
21. Fine condition.
22. No.
23. Yes.
24. Less.
25. More than usually fine in condition.
28. During the year.
29. At no time.
30. Twenty-five feet.
32. At no time.
33. July, August, and September.
34. To this I do not know what to say. Myelitis is the only disease that has particularly attracted my attention. I believe it to be in some way allied with rheumatism and cerebro-spinal meningitis. I would be greatly pleased to hear from others on this subject.

Truly yours,

Mattawan, Van Buren Co., Feb. 17, 1878. THOS. H. BRIGGS.

REPLIES BY L. H. DUNNING, M. D., OF NEW TROY, MICH.

[Note.—The following report was received, in response to the circular, from L. H. Dunning, M. D., of New Troy, committee of the Berrien County Medical Society on epidemic, endemic, and prevailing diseases in Berrien county for 1877. It is based on replies to 20 questions, a copy of which accompanied the report; 15 of which are essentially identical with questions 4, 5, 6, 8, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, and 34 of Circular 24, printed on pages 107-110 of this Report. Four of the other five questions are given in connection with the replies which they drew forth. The replies to one of them, and the question itself, are omitted, as not being pertinent to the work of this Board. Because these questions were numbered differently from those in Circular 24, reference could not well be made by number to the questions in the circular, and some of the questions sent out by Dr. Dunning are, therefore, repeated in his report. With the exception of the replies by Dr. Bell, of Benton Harbor, and Dr. Dunning, of New Troy, both regular correspondents of this Board, to the question asking for a summary statement of the diseases which have prevailed during each month of the year 1877, the replies in Dr. Dunning's report are not included in the summary of replies to Circular 24, on pages 107–110 of this Report. Additional statements relative to the meteorological conditions in this section of the State, may be found in paragraphs 7, 9, and 26 of the replies by Dr. R. F. Stratton, of St. Joseph, on pages following; also in the line for Benton Harbor, in tables and diagrams of the article on Principal Meteorological Conditions in Michigan in 1877, on pages following.—H. B. B., Sec'y.]

Mr. President and Members of the Berrien County Medical Society:

Your committee on epidemic, endemic, and prevailing diseases in Berrien county for the year 1877, has endeavored to collect facts relative to said diseases. For this purpose, in the last week of June, 1877, he sent a list of questions to each member of the society, with the request that he reply to the questions in time for him to report to the society at its meeting in July. He received replies from seven members residing at different parts of the county. From the facts thus obtained your committee made a partial report which was read at the July meeting. In January of the present year he again sent out a list of questions to all the members of the society and to Dr. G. H. Riley, of New Buffalo. He has received reports in whole or in part from the following gentlemen:

Dr. J. D. Bowman, Millburgh;
Dr. H. Clippinger, Pipestone;
Dr. Wakeman Ryno, Coloma;
Dr. J. Bell, Benton Harbor;
Dr. Alex. Scott, St. Joseph;
Dr. Robt. F. Stratton, St. Joseph;
Dr. L. Barringer, Bridgman;
Dr. C. H. Bostick, New Troy;
Dr. J. Anderson, Berrien Springs;
Dr. G. H. Riley, New Buffalo;
Dr. H. B. Wilcox, Three Oaks;
Dr. F. F. Sovereign, Three Oaks;
Dr. B. C. Smith, Galien;
Dr. W. A. Neal, Dayton;
Dr. S. Belknap, Niles City;
Dr. Welcome Mason, Berrien Springs.

The information furnished me by these gentlemen, together with facts which have fallen under my observation, is embodied in this report.

The amount of sickness in proportion to the population, is reported from all parts of the county except two, as having been less during the year 1877 than for many previous years. The exceptional points are New Buffalo and Galien, from which places the sickness is reported as having been about the same as last year, but much less than in former years. From the estimates sent me I am unable to make more than an approximate statement of the amount of the decrease of the sickness during the year, as compared with former years; but from the figures furnished, I estimate that the sickness from all causes in the north and western parts of the county has been 13 per cent less than in former years; in the west, 20 per cent less; in the south and south-east, 9 per cent less than last year; and in the central part, 10 per cent less than last year.

The proportion of deaths to inhabitants is reported less from all parts of the county except New Buffalo and Millburgh. At New Buffalo the ratio of deaths this year as compared with that of last, is as 12 to 5. The correspondent at Millburgh does not estimate the proportion of deaths to inhabitants; but the proportion of deaths to the amount of sickness is 40 per cent in excess of last year. In the north and north-west, the average of decrease is 29 per cent; in the west, 33⅓ per cent; in the south, 10.7 per cent; in the center, 10.7 per cent. An excess of sudden deaths is reported from Niles.

The following diseases were reported as having been more than usually prevalent:

Consumption at Millburgh, Benton Harbor, St. Joseph, Bridgman, Galien, Dayton, and Pipestone;
Dysentery, at Coloma;
Diphtheria, in Chickaming and Weesaw townships;
Pernicious intermittent fever, in Weesaw township;
Malarial diseases in the vicinity of New Buffalo;
Scarlatina, in the vicinity of Dayton;
Pneumonia, at Pipestone;
Inflammation and death following two cases of induced abortion, at Berrien Springs.

The following diseases were reported as being less than usually prevalent:

From the north part of the county, all diseases except consumption;
From the west part, all diseases except diphtheria and pernicious intermittent fever;

From the south-west part, lung diseases;
From Dayton, pneumonia, erysipelas, and dysentery;
From Niles, enteric and typho-malarial diseases;
From Berrien Springs, typhoid fever and diphtheria.

Diseases in which the mortality has been less:

In the north, all except consumption;
In the west, all except diphtheria;
At New Buffalo, all except lung diseases;
At Dayton, pneumonia and dysentery;
At Berrien Springs, scarlatina.

The 6th question sent out read as follows,—"State number of cases of small-pox, scarlet fever, typhoid fever, measles, whooping-cough, cebero-spinal meningitis, diphtheria, and of any epidemic, endemic, contagious, or infectious disease that has appeared." To this question the answers were not complete or precise enough to enable me to make a satisfactory report. No reference was made to endemic diseases or to prevailing diseases except where they occurred epidemically. The principal information furnished related to epidemic diseases, and is as follows:

From Millburgh, 48 cases of scarlatina and 26 cases of diphtheria were reported;
From Pipestone, 6 cases of scarlatina and 3 of diphtheria;
From St. Joseph, 15 cases of scarlatina and 15 or 20 of diphtheria;
From New Troy, 10 cases of typhoid fever, 12 of scarlatina, 14 of measles, 98 of diphtheria, 4 of pernicious intermittent fever; whooping-cough and mumps have prevailed quite extensively;
From New Buffalo, 1 case of scarlatina, a good many of measles, all treated domestically, 400 cases of mumps, 1 case of diphtheria, and 2 cases of typho-malarial fever;
From Three Oaks, mumps and whooping-cough;
From the vicinity of Dayton, 100 cases of contagious diseases, of which the names are not specified, except scarlatina and measles; of the latter disease 6 have occurred.
From Galien, 12 cases of scarlatina and 1 of typho-malarial fever; whooping-cough, has been prevalent: diphtheria was prevailing on Jan. 23;
From Niles, 2 cases of small-pox, 50 cases of scarlet fever, 4 of typhoid fever, and 10 of diphtheria;
In the vicinity of Berrien Springs, scarlatina has prevailed extensively; measles had a regular run; whooping-cough has prevailed to a slight extent; and there have been a few cases of diphtheria;
From Benton Harbor and vicinity, 30 cases of scarlatina were reported, and 12 of diphtheria.

Question 8 read, "Please give a summary statement of the diseases which have prevailed during the year 1877." The replies are grouped in the following summary [pages 144, 145].

In answer to the question, "Please mention dates of any disease not usually occurring in your locality, and of any attended with an unusually high or low rate of mortality," Dr. Bowman mentioned one case of puerperal convulsions occurring July 19; Dr. Clippinger reported 2 cases of apoplexy—both fatal—and also one fatal case of fatty degeneration of the heart; Dr. Scott reported five cases of cholera infantum, of which three died; Dr. Anderson stated that "scarlatina made its appearance in this place (Berrien Springs) June 25, and has prevailed extensively, cases having occurred in the vicinity until the middle of December. It was very mild, not a fatal case being reported." Dr. Neal mentioned one fatal case of pleuro-pneumonia occurring in June and one case of pleurisy in August.

Diseases prevailing in the county the third week in January, 1878 (the time of sending the reports):

At Millburgh, none;
At Pipestone, one case of measles and a few cases of chills;
At Benton Harbor, pneumonia, intermittent fever, neuralgia, influenza;
At St. Joseph, mumps and intermittent fever;
At Bridgman, an epidemic of false diphtheria.
At New Troy, diphtheria, typhoid fever, pneumonia;
At New Buffalo, mumps, measles, and a few cases of ague;
At Three Oaks, "catarrhal and throat disease;"
At Dayton, scarlatina, malarial and bronchial diseases;
At Niles, lung diseases;
At Berrien Springs, malarial diseases and pneumonia.

Summary Statement of the Diseases Prevailing in Berrien County,

LOCALITIES AND OBSERVERS.	JANUARY.	FEBRUARY.	MARCH.
Millburgh, Dr. J. D. Bowman.	Lung diseases, influenza.	Lung diseases, influenza, rheumatism.	Diphtheria, a few cases of bilious fever.
Bridgman, Dr. L. Barringer.	Malarial diseases.........	Malarial diseases.........	Malarial diseases.........
New Troy, Dr. C. H. Bostick.	Malarial fever and Rheumatism.	Malarial fever and rheumatism.	Malarial fever and rheumatism.
New Troy, L. H. Dunning.	Bronchitis, bronchial pneumonia with children, pneumonia.	A few cases of bronchitis and pneumonia.	Bronchitis, bronchial pneumonia, and a few cases of measles.
Three Oaks, Drs. Sovereign and Wilcox.	Inflammatory diseases...	....	....
Dayton, Dr. W. A. Neal.	Bronchial catarrh, intermittents.	....	Scarlatina, winter cough, intermittents.
Niles, Dr. S. Belknap	Scarlatina, a few cases of so-called diphtheria, lung and throat diseases.		
Berrien Springs, Dr. Thos. Anderson.	Not much sickness. Malarial fevers, a few cases of pneumonia, and 1 case of measles.		Malarial fevers, broncho-pneumonia, and rheumatism.
Benton Harbor, Dr. J. Bell.	Bronchitis, consumption, diphtheria, pneumonia, intermittents, and erysipelas.	Same as in January, excepting erysipelas and with the addition of influenza.	Same as in February, with addition of scarlatina, some remittent, asthma, and neuralgia.

LOCALITIES AND OBSERVERS.	JULY.	AUGUST.	SEPTEMBER.
Millburgh, Dr. J. D. Bowman.	A few cases of summer complaint and sporadic cases of dysentery.	Cholera infantum, dysentery, intermittents, 3 cases of pernicious intermittent.	Intermittents, with a few cases of remittents.
Bridgman, Dr. L. Barringer.	Malarial diseases.........	Malarial diseases.........	Malarial diseases.........
New Troy, Dr. C. H. Bostick.	....	Malarial fevers and diphtheria.	Malarial fever and diphtheria.
New Troy, L. H. Dunning.	Malarial diseases, 1 case of pernicious intermittent.	Malarial fevers, a few cases of cholera infantum, dysentery.	Malarial fevers, 1 case intermittent, rheumatism.
Three Oaks, Drs. Sovereign and Wilcox.	Malarial diseases and dysentery.	Diarrhea and intermittent fevers.	Diarrhea and intermittent fevers.
Dayton, Dr. W. A. Neal.	Diarrhea, intermittents, remittents, scarlatina.	Intermittents, remittents, diarrhea.	Remittents and intermittents.
Niles, Dr. S. Belknap	Bowel difficulties, with some severe cases of dysentery; intermittent and		
Berrien Springs, Dr. Thos. Anderson.	Sickness increasing. Typho-malarial fever, one case inflammation of liver (fatal).	Malarial fevers, infantile convulsions, and summer complaint.	Malarial fever and scarlatina.
Benton Harbor. Dr. J. Bell.	Same as in June, with diarrhea added.	Same as in June, with dysentery added.	Dysentery, intermittent and remittent fevers, consumption, scarlatina, and diarrhea.

To the question, "Are any diseases now especially or unusually prevalent? if so, what diseases? and to what extent?" the answer is "No" from all points except the following: Millburgh, from which place one recent case of cerebro-spinal meningitis was reported, which proved fatal in fifty hours,—age of patient, 35 years; Bridgman, where false diphtheria is prevailing extensively; New Troy, where diphtheria is quite prevalent; mortality reported, 1 to 13 by one, and 1 to 20 by another; and Dayton, where scarlatina is prevalent.

Michigan, during the Year 1877. (*See paragraph "Question 8," page 143.*)

APRIL.	MAY.	JUNE.
Scarlatina, rheumatism, lung trouble.	Rheumatism, scarlatina.	Little sickness; intermittents and scarlatina.
Malarial diseases.	Malarial diseases.	Malarial diseases.
----------	----------	----------
Catarrhal troubles, rheumatism.	Sickness light; a few cases of intermittents.	Sickness light; some intermittents.
Diseases of the throat, rheumatism.	Bilious attacks.	Malarial diseases and dysentery,
Pneumonia, measles, remittents,	Intermittents and remittents.	Intermittents, remittents, scarlatina, and consumption,
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Malarial fevers, pneumonia, and rheumatism.	Less sickness; pneumonia and malarial fevers.	Little sickness; miscellaneous in character.
Intermittents, consumption, pneumonia, and rheumatism.	Same as April, with diarrhea added.	Scarlatina, rheumatism, intermittents, remittents, cholera infantum, and cholera morbus.

OCTOBER.	NOVEMBER.	DECEMBER.
Rheumatism and intermittents.	Sickness light; no special diseases.	Sickness light; some scarlatina in latter part.
Malarial diseases.	Malarial diseases.	Malarial diseases; pneumonia and pleurisy, complicated by malaria.
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Malarial diseases, a few cases of diphtheria.	Remittent fever, diphtheria, rheumatism.	Diphtheria epidemic; 3 cases of scarlatina; pneumonia, and whooping-cough.
Diarrhea and intermittent fevers.	Neuralgia and inflammatory diseases.	Neuralgia and inflammatory diseases.
Remittents and intermittents.	Scarlatina and intermittents.	Scarlatina and intermittents.
remittent fevers.		
Malarial fevers, vomiting present in nearly all cases.	Malarial fevers.	Malarial fevers and a few cases of pneumonia.
Same as in September, except diarrhea.	Bronchitis, consumption, diphtheria, diarrhea, intermittents and remittents, influenza.	Same as in November, except diarrhea and with addition of scarlatina, asthma, and neuralgia.

Question 10 read, "State facts you have observed regarding malarious diseases. Have they been more or less frequent? more or less fatal? If there has been an increase or decrease in frequency or fatality, to what do you attribute the cause?"

Dr. Bowman states that they have been on the decrease in his part of the county for the past six years. He attributes this to the thorough drainage of the lands. He writes: "I know of many parcels of land in the vicinity of Pipestone that nine years ago could not be traversed by a team, which are now in a good state of cultivation. The St. Joseph river is much lower, the streams through the county are much smaller, and very much less water is standing in swamps and marshes. I am a firm believer in the theory of vegetable decomposition being the origin of miasma or malaria."

Dr. Ryno reported less malarial diseases this year than heretofore,—no fatal cases. He attributes this to good drainage and even temperature.

Dr. Clippinger wrote, "No fatal cases; malarial diseases less prevalent."

From St. Joseph and Benton Harbor this class of diseases was reported less prevalent. The improved condition of the country and of the surroundings of the people is assigned as the cause of the decline of this disease.

At Bridgman malarial diseases are not of so frequent occurrence, but more malignant in type. No cause of the change is assigned.

At New Troy they occur much less frequently than two or three years ago. They are not so often met with as a complication in acute diseases. Extensive drainage has been carried forward during the last two years in our township. This has accomplished wonders in removing malarial diseases. Our people, too, have many of them learned to avoid exposure during the night and in damp weather, and have thus avoided attacks of the disease.

Four cases of pernicious intermittent have occurred in the township of Weesaw during the year. Two were fatal, both of which occurred in one neighborhood,—one in June, the other in September. The one occurring in June was that of a child 3 or 4 years old, whose home was near the bed of a millpond now dry. The other case was that of a man 50 years old, who had been engaged for a week previous to his attack in ditching a piece of marshy ground upon his premises. There was nothing peculiar about the cases, and they are mentioned only as another illustration of the danger of long-continued exposure to malarious poison.

At New Buffalo they have been unusually prostrating and unyielding, slightly more frequent and fatal.

At Three Oaks they are less frequent and less fatal. Their fatality and frequency have decreased in proportion to the clearing and draining of the lands.

Galien, once noted for the frequency of chills, ague, etc., is now "distressingly healthy." This reporter facetiously remarks, "I think a just retribution will surely overtake the drain commissioner for indirectly robbing the poor doctors of their only means of support."

Malarious diseases are less frequent at Dayton, on account of the "development of the country."

At Niles the reporter does not think this fever has been more fatal, but there has been an excess of remittent fever. "Some of the most obstinate cases occurred with men who were engaged in cutting up corn. In such cases the fever would come on without any observable premonitory symptoms."

From Berrien Springs one observer wrote: "During the Fall and Winter malarious diseases have been of a lower form and more lingering"; another, that casual observation has led him to think that "Gradual drying of the wet grounds and swamps tends to increase malarial sickness, while abundant rains diminish it." He thinks, also, that "An elevation of the temperature of the atmosphere tends to develop sickness in those who are already contaminated by malarious poison."

Question 14 read, "Compared with former years, has consumption been more or less frequent during the year ending Dec. 31, 1877? Has the mortality been greater or less? What, in your opinion, has been the cause of the increase or decrease?"

From all points north and north-west, except Coloma, consumption was reported as more prevalent and more fatal than in former years. In the vicinity of New Troy it has been less frequent.

From New Buffalo the reporter writes: "Remarkable to say, pulmonary consumption has affected none of our residents since I have lived here [I think this has been during the last three years.—L. H. D.] No cases of consumption have come under the observation of the correspondents at Three Oaks. No deaths have occurred in that locality from the disease. From Galien and Dayton it was reported as more frequent and the mortality greater. From Niles the frequency and mortality of consumption was reported as being about the same as in former years.

In the central part of the county "few cases have occurred and few deaths." It is not stated whether it is more or less frequent or more or less fatal.

Among the causes affecting the frequency and mortality of consumption, the following were suggested:

Atmospheric changes and hygienic imprudences have favored its increase in this locality (Pipestone); some persons from other climates have sunk rapidly after moving here.

Dr. Bostick thinks a warm and humid atmosphere the cause of the decrease of frequency and mortality in the vicinity of New Troy.

Dr. Smith is unable to assign any cause for the increased prevalence of consumption in his locality. He says: "It may be, as some writers claim, that there is an antagonism between malarial diseases and tuberculosis; and since malarial diseases are letting up on us, we are getting that dreaded malady, consumption. Probably civilization has as much to do as any one cause with the destruction of the human family. In most new countries consumption is almost unknown; but in a few years, as the country is settled up and the more hardy pioneer moves out of his old log house with its large fireplace, which is the best ventilation in the world, into his new mansion, which is almost air-tight, his physical condition declines; for there he commences to eat, drink, and sleep in a vitiated atmosphere, made so by the exhalations from his own lungs.

"You know that most of our houses are entirely destitute of ventilation; and if it were not for the unskillfulness of our mechanics, people would be suffocated to death in their own bedrooms; for I find it not unusual for two, or even three, grown people to sleep in a bedroom 8x10, or even smaller, with doors and windows closed, and hardly ever air their rooms during the day, or allow any of the rays of sunlight to enter. What must be the condition of atmosphere under such conditions to aid in carrying on healthy nutrition? *Judge ye.*

"It appears to me that if a healthy pair of lungs daily takes in atmosphere kept poisonous for want of ventilation, and that atmosphere has already been inside of a pair of consumptive lungs, it must have a tendency to communicate the disease."

To the question, "What diseases have prevailed, and to what extent, among animals?" hog cholera is reported from all points except Bridgman and New Buffalo. Distemper among young horses has prevailed to a slight extent in the vicinity of Pipestone and Galien, and obscure disease among cattle at Pipestone. No other disease among animals is mentioned.

To the question, "Have potatoes, hops, fruits, and especially cereals and grapes, been affected by rust, smut, mildew, or mould?" the answer is "No" from all points except the following: Galien, where potatoes were affected by dry rot, peaches were not good, were covered with specks, and apples decayed rapidly; Bridgeman, where briar-fruit was affected by rust; Berrien, where there was a little smut in wheat in some localities. Rye, oats, corn, buckwheat, and other grains were a good crop throughout the county. They were free from fungi, and in good condition when brought to market. Hay was everywhere a good crop, and was secured without being unusually affected by mildew or mould, at all points except Pipestone and Dayton, where it was reported "rather more than usually affected by mildew and mould."

Question 20 read, "Please communicate facts bearing upon, or cases illustrating the causation or communicability of diseases." To this question, but two answers have been received. Dr. Bostick expresses it as his opinion that "A warm, humid atmosphere is favorable to the transmission of contagion, particularly that of diphtheria, scarlatina, and typhoid or enteric fevers." Dr. Sovereign mentioned over exertion and carelessness as being the cause of most of the diseases in his part of the county. Under this head, I wish to mention two cases illustrating the necessity of avoiding sudden changes of temperature or exposure to cold during the convalescence after diphtheria.

(*Case 1.*)—L. F. Boyce, aged 3 years, was attacked October 8 by diphtheria in a mild form. The disease progressed favorably until October 13, when all traces of the pseudo-membrane had disappeared and the patient was declared convalescent. October 16, in the afternoon, while his mother was engaged washing, the little boy stole out the door and stood for several minutes upon the porch, catching eaves-drops in his hands. It was raining, and the air was raw and chilly. At 11 P. M. symptoms of acute laryngitis (diphtheritic) appeared and gradually developed until he died, October 20, at 1 P. M.

(*Case 2.*)—Harry Obarton, aged 4 years, was attacked by diphtheria November 12. The disease ran a favorable course until November 18, when I pronounced the patient convalescent, the pseudo-membrane having all disappeared from the pharynx and tonsils, and the little boy played around the room as usual when well. All went well until the night of November 21, when I was summoned in great haste to visit the child, who, his father said, had the croup. I found diphtheritic laryngitis had developed. The case terminated fatally upon the night of November 24. Believing that the patient had taken cold, I made careful inquiry and learned that the day previous to his attack by the laryngitis he had climbed into a chair in front of a window having a broken pane of glass. Before this opening he had played and thrust his hands and arms out of it until he was thoroughly chilled. I have notes on three other cases in which serious consequences followed undue or too early exposure after diphtheria. Such instances forcibly remind the physician that his whole duty in cases of diphtheria is not discharged, until he has warned the parents or friends of the patient of the danger of exposure to cold before he has entirely recovered from all the effects of the disease.

It will be seen by the reports that during the year 1877 the people of this county have to a remarkable degree enjoyed the blessing of health. Only one disease, scarlatina, has prevailed epidemically throughout the county; and only one disease, consumption, has been more than usually fatal. Even that hydra-headed monster, malaria, has attacked the people less frequently, at fewer points, and in fewer forms than ever before. Animals, too, have enjoyed immunity from disease, except the hog, which, many uncharitable doctors think, merits sickness and death. Crops, with hardly an exception, have been good and well secured.

While in nearly all parts of the county consumption is on the increase, very little of it is known in the south-west section; yet that section is the most noted, at present, for the prevalence of malarious diseases, and it is probably, too, the least developed section of the county.

Respectfully submitted,

New Troy, Berrien Co., Feb. 13, 1878. L. H. DUNNING,

Committee of the Berrien County Medical Society on Epidemic, Endemic, and Prevailing Diseases for the year 1877.

REPLIES BY SIMEON BELKNAP, M. D., OF NILES, MICH.

1.* About 5,500.
2. Fifty-two.
3. City and surrounding country.
4. Nearly one-third less.
5. About the same.
6. Sudden deaths were in excess, generally attributed to heart disease. I do not think any disease was unusually prevalent.
7. ———.
8. Malarial fevers; typhoid fevers.
9. Favorable weather.
10. Old age, 15; consumption, 7.
11. I cannot.
12. Typhoid and typho-malarial fevers.
13. Favorable weather.
14, 15. I cannot give dates.
16. None—none—6—2—0—0—0—0—0—4.
17. Cholera, cerebro-spinal meningitis.
18. *January:* Influenza, remittent fevers, erysipelas, bronchitis.
    February: Influenza, pheumonia, bronchitis.
    March: Scarlatina, intermittent fevers, consumption.
    April: Intermittent fevers, scarlatina, consumption.
    May: Intermittent fevers, remittent fevers, scarlatina.
    June: Intermittent fevers, remittent fevers, cholera morbus.
    July: Intermittent fevers, diarrhea, cholera morbus, and cholera infantum.
    August: Intermittent fevers, diarrhea, dysentery, cholera morbus, and cholera infantum.
    September: Intermittent fevers, diarrhea, dysentery, cholera morbus, and cholera infantum.
    October: Intermittent fevers, remittent fevers, diarrhea, and dysentery.
    November: Intermittent fevers, remittent fevers, and typho-malarial.
    December: Intermittent fevers, remittent fevers, influenza.
19. Cholera among hogs, during Autumn months.
20. Fly in wheat; potato bugs.
21. Better than the average.
22. No.
23. Yes.
24. —.
25. No.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

26, 27. I cannot.
28. June, dry.
29. July.
30. On flats, 10 feet; on hill, 35 feet.
31, 32, 33. I cannot say.

Very respectfully,

Niles, Berrien Co., March 21, 1878. SIMEON BELKNAP, M. D.

REPLIES BY MILTON CHASE, M. D., OF OTSEGO, MICH.

1.* I live in the incorporated village of Otsego, Allegan county, Mich., a village of about 800 inhabitants.
2. About 18.
3. A radius of about six miles.
4. About an average, but more than last year.
5. I should think a little less than the average.
6. Scarlet fever.
7. We seldom have a visit of scarlet fever.
8. I cannot say that any were.
9. ——.
10. Scarlet fever.
11, 12, 13. ——.
14. Scarlet fever in July and August.
15. June, July, August, September.
16. Of scarlet fever, 15; of typhoid fever, 1; of whooping-cough, upwards of 50.
17. Small-pox, cholera, measles, cerebro-spinal meningitis, diphtheria.
18. August, September, July, June, May, April.
19. A number of horses died in the Spring with pneumonitis; and a few hogs have died, but of what diseases I do not know.
20. I think that but little has occurred under this head.
21. Very good.
22. No.
23. Yes.
24. Less.
25. No.
27. ——.
28. None.
29. July.
30. In the village, about 16 feet.
31, 32, 33. ——

Where I have drawn a line after a question, I mean that I have no answer to make.

Otsego, Allegan Co., Feb. 24, 1878. MILTON CHASE, M. D.

REPLIES BY J. ANDREWS, M. D., OF PAW PAW, MICH.

1.* About two thousand.
2. Ten, as nearly as can be ascertained.
3. Territory of about ten miles, in all directions, from the village of Paw Paw.
4, 5. About the same as during the two or three previous years.
6. Old age, cancers of various kinds, and myelitis, or disease of the brain and spinal marrow.
7. Cancers and disease of the nervous centers have been more than usually prevalent. I cannot assign any cause.
8. Typhoid fevers and pneumonia.
9. Lessened malarial influence, from moderately dry seasons and more perfect drainage of low lands.
10. The reply to question 6 answers this.
11. There has been no unusual mortality in this locality; nor can I give any cause for what there has been.
12. There has been little mortality from any disease, except those of a malignant character, consumption, and some that necessarily have a fatal termination.
13. The mildness of the diseases that have prevailed, except as above.
14. The rate of mortality has been low as to all ordinary diseases.
15. Diseases not usually occurring in this locality have been pretty equally distributed over the year 1877.
16. No small-pox or cholera; but three or four mild cases of scarlet fever; perhaps

two or three of typhoid fever; no measles; a little whooping-cough; no cerebro-spinal meningitis, diphtheria, or any other epidemic, endemic, contagious, or infectious disease.

17. Small-pox, cholera, measles, cerebro-spinal meningitis, and diphtheria.

18. I cannot do it.

19. No disease among animals, except that a few hogs died in the Fall, of what disease I do not know.

20. Insects in the wheat, and potato bugs, if they may be called disease; that's all.

21. Generally in good condition.

22. No, I think not.

23. It was.

24. No banking in the bin, that I have heard of.

25. Less than usually affected.

26, 27, 28, 29. I have no record to enable me to answer these questions correctly.

30. The average is about twenty-five feet; but the depth varies so much in short distances that it is difficult to give more than an average.

31, 32, 33. The depth of earth above the ground water does not vary much in any season, whether wet or dry.

Paw Paw, Van Buren Co., March 21, 1878. J. ANDREWS.

REPLIES BY R. F. STRATTON, M. D., OF ST. JOSEPH, MICH.

1.* Township and village, 3,000.

2. The most careful inquiry gives the number of deaths in St. Joseph, for the year 1877, as 29. This is believed to be the lowest death-rate for many years. On a basis of 3,000, our present estimated population, this gives 9.66 deaths to the 1,000 inhabitants. By the best information within my reach (no absolute accuracy pretended or possible), in 1876 our death-loss was 10.33 to the 1,000; in 1875 it was 16.66 to the 1,000. Of the 29 deaths, 17 were children and 12 adults. Of the 17 children, 3 were still-born, 3 had remittent fever, and 11 a record of convulsions. Of the 12 adults, 1 died of heart disease; 1, of paralysis; 1, of chronic rheumatism; 3, of fever (remittent and typhoid); and 6, of consumption; 4 were old people.

3. To the township of St. Joseph, comprising eight sections of land. My practice also gives me a limited knowledge of the sickness in adjoining towns, this sickness being of about the same character.

4. Ten per cent less.

5. One per cent less.

6. Consumption and scarlatina, for a limited time.

7. I attribute the general prevalence of consumption to the unfavorable Winter of 1876–7. The first and most destructive element was the absence of humidity, and the second was long-continued low temperature,—the Winter being persistently cool, if not cold, and bleak weather being prolonged far into the Spring. Consumption in some stage had been present many years, but this Winter forced these cases into the last stage.

8. Malarial diseases and all diseases of malarial origin.

9. To the clearing of the land, the more general cultivation and drainage of the soil, and the more wholesome domestic conditions of the people. The meteorological conditions were also favorable, heat and moisture not being both in excess at the same time.

10. Consumption.

11. See answer 9.

12. Scarlatina and malarious diseases.

13. Scarlatina from the first assumed a mild form. I can give no good reason for it. There was less congestive intermittent and less pernicious remittent. See answer 9.

14. Scarlatina, in January and April; Measles in May,—both with a low rate of mortality. Consumption, a high rate of deaths pretty equally distributed throughout the year; but before warm weather they had all passed into the hopeless stage. In September and October malarial diseases had a high rate of mortality compared with other months.

15. None.

16. My opinion is that there occurred 10 cases of scarlet fever, 10 of typhoid or typho-malarial, 20 of measles, 6 of diphtheria (mild form).

17. Small-pox, cholera, cerebro-spinal meningitis.

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*The figures beginning paragraphs refer to questions in Circular 24, on pages 103-9 of this Report.

18. *January:* Bronchitis, consumption, diphtheria, rheumatism, scarlatina, remittent fever.
February: Bronchitis, remittent fever, pneumonia, diphtheria, consumption, scarlatina, rheumatism.
March: Intermittent fever, remittent fever, bronchitis, pneumonia, rheumatism, consumption, diphtheria.
April: Remittent fever, intermittent fever, consumption, bronchitis, pneumonia, rheumatism, diphtheria, dysentery, scarlatina.
May: Measles, remittent fever, consumption, bronchitis, rheumatism, scarlatina.
June: Remittent and intermittent fevers,—very little sickness.
July: Cholera infantum, cholera morbus, intermittent fever, remittent fever.
August: Diarrhea, dysentery, remittent fever, intermittent fever.
September: The same as August.
October: The same as August, with typho-malarial fever, cholera infantum, influenza, consumption.
November: Rheumatism, diphtheria, consumption, intermittent fever, remittent fever, typho-malarial fever, bronchitis.
December: Bronchitis, intermittent fever, remittent fever, diphtheria, rheumatism.
19. None here.
20. None.
21. First rate.
22. No.
23. Yes.
24, 25. Less.
26. *January:* Quite cold, with deep snow.
February: Wells very low, and absence of humidity in the air.
March, April, and first half of *May*, very bleak and cold.
Summer: Not very warm, and never a rainfall beyond the capacity of the surface soil to absorb.
Autumn: The same.
November: Several unseasonable warm spells.
December: Very little snow, frequent but not excessive rains, and a high Winter temperature.

27. February, August, September, March, April, October, January, July, June, May, December, November. I give this partly from notes, partly from memory.

28. February, May, July, January.

29. December.

30. In the village, surface-wells 3 to 4 feet; deep wells 70 feet. In the country, 10 to 30 feet, according to formation.

31. Six feet in February, May, and July,—very low for us. In other months it varied from that to six inches.

32. April, June, November, December.

33. February, May, July, August, September.

34. 17 children died—3 were still-born, 14 were surrounded by unsanitary conditions; 2 boys (10 to 12) died of pernicious remittent fever, the effect of exposure to malaria; 9 died with a record of convulsions, which means malaria, damp, and diet; 6 adults (one-half the adults who died) died of consumption. I have claimed that intermittent fever will in time induce consumption. It induces a long-continued low vitality which invites a tubercular deposit.

The Rev. Mr. Bitner has three children sick with scarlatina. A girl came a long distance from a family similarly afflicted, into his family. The children were taken sick in 3 days. They were our first and only cases.

Respectfully yours,
St. Joseph, Berrien Co., Feb. 18, 1878. R. F. STRATTON.

REPLIES BY CHAS. P. WELLS, M. D., OF POKAGON, MICH.

1.* Township of Pokagon, Cass Co., Michigan.

2. —.

3. Pokagon township.

4, 5. Same as average.

6. There was no unusual prevalence of disease. Our diseases were mostly of malarial origin.

7. —.

8. Scarlet fever, measles, dysentery, and diphtheria.

9.* No contagious disease prevailing.
10. None.
11. —.
12. Pneumonia.
13. The mildness of the winter months.
14. —.
15. No unusual disease.
16. —.
17. Small-pox, cholera, cerebro-spinal meningitis.
18. —.
19. Hog cholera, during summer months; and mortality among horses, from disease unknown.
20. Smut in wheat.
21. Good, excepting the smut.
22. Yes.
23. Yes.
24. Did not.
25. Hay usually good.
26, 27, 28. I have no record.
29. —.
30. In valleys and along water-courses, 12 to 20 feet; and on high lands, 20 to 70 feet.
31, 32, 33. —.
34. Hay fever was unusually mild last year in this locality, apparently because of the lessened abundance and stunted growth in the township, of *Ambrosia artemisiæfolia*, or common ragweed, which is deemed the principal exciting cause of the disease. It is worthy of notice that the township restrained hogs from running at large during 1877, grass was allowed to grow undisturbed along the highways, and but little ragweed grew in the public highways as heretofore.

Respectfully,
Pokagon, Cass Co., Aug., 1878. CHAS. P. WELLS.

SOUTHERN CENTRAL DIVISION OF THE STATE.†

REPLIES BY JOHN P. STODDARD, M. D., OF ALBION, MICH.

1.* 3,000.
2. 70.
3. For the village of Albion, Michigan.
4. Greater.
5. Less.
6. There was greater prevalence than usual of scarlatina, and also of diphtheria.
7. I cannot, satisfactorily to myself.
8. There were less sudden changes of the temperature and not the usual amount of excessive heat and cold.
9. Same as above.
10. There were more deaths (though but very few) than usual from scarlatina and diphtheria; for during the past ten years we have been free from these affections almost entirely.
11. —.
12. From diseases of old age, and from diseases incident to hot weather.
13. To improved climatic influences.
14. Unusually low mortality from scarlatina, during August, September, October, November, and December.
15. Diphtheria during January, February, and March; scarlatina from July to December, inclusive.
16. Of scarlet fever, 36 cases (probably); of typhoid fever, 4 cases; of whooping-cough, 5 cases; of diphtheria, 3 cases.
17. Small-pox, cholera, cerebro-spinal meningitis.
18. *January*: Influenza, bronchitis, diphtheria, remittent and intermittent fevers.
February: Influenza, bronchitis, pharyngitis, remittent and intermittent fevers.
March: Influenza, bronchitis, pneumonia, and rheumatism.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.
† For counties in each division, see Exhibit 1, page 113.

April: Influenza, bronchitis, rhumatism, pneumonia.
May: Influenza, scarlatina, bronchitis, rheumatism, and pneumonia.
June: Influenza, remittent and intermittent fevers, consumption.
July: Intermittent fever, influenza, consumption, bronchitis.
August: Cholera infantum, dysentery, cholera morbus, intermittent fever, consumption.
September: Intermittent fever, diarrhea, dysentery, consumption.
October: Intermittent fever, scarlatina, influenza.
November: Influenza, intermittent fever, bronchitis, scarlatina.
December: Influenza, intermittent and remittent fevers, bronchitis.

19. No one disease extensively prevailing to my knowledge.

20. I can't say positively, except some smut on wheat and corn; potato bugs; apples of a very poor quality as keepers, probably due to apple worms.

21. Good.

22. No.

23. Yes.

24, 25. Less.

26. I can't do it.

27. I have not the data by me on which to do it.

28, 29. No great change either way.

30. In part of village, wells are about 20 to 30 feet deep; in other parts, from 10 to 15. In certain localities, the cellars are liable to be partially flooded on a small rise in river or abundant rains, owing to their near presence to a large race and a partially undrained marsh.

31. I cannot say, but I believe that the depth of earth above water-mark has been greater this year (1877).

32, 33. I can answer no better than above.

34. The experience of this year in regard to scarlet fever and diphtheria has more than ever impressed upon my mind the necessity of enforcing strictly the laws in regard to contagious diseases, and the futility of treatment if these laws are not observed.

I am sorry that, at present, we have in this village (and I suppose the condition is not peculiar to this vicinity) no better or surer way of getting at health, disease, and mortuary statistics than to *guess* at them to so great an extent. I trust the time will *soon* come when each physician will be *compelled* by law to report statedly *every* case of sickness, every birth, every death, to a health officer, who shall be paid enough so that he can give some little time to the matter. I trust, also, that the time will soon arrive, when the medical profession will be enough enlightened and liberalized by a scientific spirit as well as education, not to let professional bigotry, personal jealousies, and low motives keep them from reporting their cases, enlightening the public, and carrying out the present provisions of our statutes.

Yours truly,

Albion, Calhoun Co., Feb. 26, 1878. JOHN P. STODDARD, M. D.

REPLIES BY N. D. YALE, M. D., OF DEERFIELD, MICH.

1. Deerfield is incorporated. The village contains about 700 inhabitants.

2. Nine.

3. Village and township of Deerfield and adjacent parts of the townships of Blissfield, Ridgeway, Dundee, Summerfield, and Whiteford.

4. Less than in 1876, but about upon an average with previous years.

5. About the usual average.

6. None.

7 to 15. Our season has been a fair average, with no marked variation in healthfulness or mortality.

16. Of scarlet fever, I saw 4 mild cases; of typhoid fever, I attended and knew of 9 cases; of whooping-cough, there were very many cases; of cerebro-spinal meningitis, I saw one fatal case, and heard of no others; of diphtheria, there were a few mild cases, no deaths.

17. Small-pox, cholera, measles (I think).

18. I cannot answer.

19. None that I learned.

20. Corn was smutted; rot in potatoes, to a slight extent; apples kept badly.

21. Good.

22. Except corn, as stated,—No.

23.[*] Yes.

24. Less.

25. The hay crop was a fair average and well secured.

26. I cannot.

27. I have to use my memory, and may not be exact. I think the dry months, in order of dryness, were May, October, and February.

28. No month was exceedingly dry. February was a very dry month for a Winter month; roads were dusty most of the month. May was dry, but seeds germinated, if planted carefully in well prepared ground. No rain fell in October, but the first half of September was very wet, and we had rain in November.

29. December, 1877, was a very wet month. Part of June, and the first half of September.

30. Along the river and south of it, water is found from 4 to 10 feet down. North-east of Deerfield, in places, they have to dig forty to fifty feet.

31. I cannot answer.

32, 33. No excessive variation occurred, as compared with other years.

Deerfield, Lenawee Co., Feb. 21, 1878. NATHAN D. YALE.

REPLIES BY J. W. FALLEY, M. D., OF HILLSDALE, MICH.

1.[*] Of city, between 3,500 and 4,000. Our county has between 32,000 and 33,000 inhabitants; our city, between 3,500 and 4,000,—1,060 between the ages of 5 and 21, last September. From December 31, 1876, to December 31, 1877, our undertaker buried 77 in the country and 72 in the city; total, 149. If he buried, as I believe he did, one-third of all the dead in the county, it would make a total in the county of 447,—making the ratio of deaths in the county, 1.3 per cent; and in the city alone, 2 per cent. In the city more than one-half, and I believe two-thirds, were under 10 years of age. In the country, a large number were children.

2. Just 72.

3. Hillsdale county. My duties for the last fifteen years as county physician and superintendent of the county poor, make me about as familiar with sickness in one part of the county as in another.

4. Greater; but it varies in localities.

5. From report of undertaker, greater. See answer 2.

6. Scarlatina,[†] diphtheria, whooping-cough, rubeola, some typhoid fevers,—and bilious fevers in the Fall.

7. Extremely wet till July, then as extremely dry and hot,—a good arrangement for developing miasm. The other diseases mentioned in answer 6 break out here and there through the county without any perceptible cause. Scarlatina, diphtheria, whooping-cough, and rubeola have hung over our city more than one year,—sometimes quiet for weeks, sometimes here and there isolated cases, sometimes breaking out in some locality with great fierceness, giving no warning and showing little reason.

8. I think puerperal fever, consumption, and cerebro-spinal meningitis; and I might say there was almost an absence of dysentery.

9. I know of none.

10. Scarlatina,[†] diphtheria, and croup. The first two are *cousins*, are they not?

11. I cannot; the best localities were visited; the poorer suffered the most.

12. Consumption, cerebro-spinal meningitis, puerperal fever.

13. It comes so sometimes. That is all I can say.

14. June, July, and August were the healthiest months. The scarlatina, diphtheria, and croup raged most in later Fall, in December, and in early Spring. Few children died of anything else.

15. See answer 16.

16. Of small-pox, 2 cases, in the Winter; of cholera, none; of scarlet fever, into the hundreds; of typhoid fever, very few indeed; of rubeola, much in places and at times all over the county; of whooping-cough, some, not badly; of diphtheria, much, and sometimes confused and confounded with scarlatina; of cerebro-spinal meningitis, I do not know of one case.

17. See answer 16.

18. I cannot. As stated in answer 14, June, July, and August were the healthiest;

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[*] The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

[†] [Jan. 16, 1878, Dr. Falley wrote: "For the last 9 or 10 months we have suffered much from scarlatina. Sometimes it dies out for several weeks, then it breaks out with great violence. There have been many deaths from scarlatina, diphtheria, and croup."—H. B. B., *Sec.*]

next September and May, also October. The above-named diseases, with a small supply of Fall fevers, and a limited supply of pneumonia,—not one case of either of the last two where we had 20, I would say 30 cases, 25 and 30 years ago, in proportion to the population now and then.

19. Nothing unusual; some pneumonia in the cold weather, usually from carelessness; other occasional diseases.
20. Remarkably free from all.
21. Generally in prime condition.
22. No; very little in corn.
23. It was dry, as we had almost no rain at the time.
24. Almost none.
25. Some early-cut clover was ruined; the bulk was good.
26. I have no means, only from memory.
27. September, August, and last two-thirds of July were very dry; the Spring months and June were wet, and the balance was an average.
28. As above.
29. See answer 27.
30, 31, 32, 33. Are about as well answered in the above as I can give them.

Respectfully submitted,

Hillsdale, Hillsdale Co., Feb. 22, 1878. J. W. FALLEY.

REPLIES BY WILLIAM WORSFOLD, M. D., OF JACKSON, MICH., RELATIVE TO DISEASES IN AUGUSTA, MICH.

1. *About 350 or 400.
2. 3.
3. The village of Augusta, Kalamazoo Co., and a radius of 4 miles.
4. Less,—I cannot say how much decrease.
5. Less. Deaths probably about one-third of usual ratio.
6. None.
8. All.
9. General causes, meteorological, internal, etc.
10. None.
12, 13. There was a diminished prevalence of all diseases, a milder type, and hence a lessened mortality.
15. March 24, 1877, diphtheria; November 7, scarlet fever.
16. One case of diphtheria, 4 cases of scarlet fever.
17. All except the two above.
18. *January:* Bronchitis, p. congestions, rheumatism, influenza, pneumonia.
February: Bronchitis, influenza, p. congestions.
March: Bronchitis, influenza, rheumatism, p. congestions.
April: Laryngitis, tonsilitis, p. congestion.
May: A little intermittent and remittent fever.
June: ———.
July: Intermittent and remittent fever.
August: Intermittent and remittent fever.
September: Intermittent and remittent fever.
October: General ailments and remittent fever.
November: Rheumatism.
December: ———.
19. From the 10th to the end of February, a catarrhal affection amongst horses.
21. Good.
22. Corn was, to some extent.
23. Yes.
24. No.
25. Hay was excellent.
27. July, August, September, May, February, June, October,—the others not much different, except November and December, which I think were the wettest.
28. July and August.
29. October, November, and December.
30. In the village, about 10 to 14 feet.
31. I did not ascertain.

The above replies are for Augusta, my recent temporary residence.

Jackson, Jackson Co., Feb. 20, 1878. W. WORSFOLD.

REPLIES BY A. R. SMART, M. D., OF HUDSON, MICH.

1.* 3,000 inhabitants.
3. Hudson village and a radius of three miles.
4, 5. About the same.
6. Scarlet fever and typhoid fever.
7. —.
8. Diphtheria, small-pox, pneumonia, dysentery, and diarrhea.
9. I do not know.
10, 11. —.
12. Diphtheria, small-pox, pneumonia, dysentery, and diarrhea.
13. —.
14. We had no epidemic.
15. —.
16. I do not know. My opinion is that there were of scarlet fever, 5 cases; of typhoid fever, 6 cases; of diptheria, 1 case.
17. Small-pox, cholera, cerebro-spinal meningitis.
18. I cannot remember.
19. Some pneumonia among animals in the Spring; and some hog cholera in the Fall.
20. Fruit rots unusually.
21. Good.
22. No.
23. Yes.
24, 25. Less.
26. I cannot recall them.
27. Driest during Fall.
28. Not unusually dry.
29. During Spring months.
30. 20 feet.
31. I cannot state.
32. It was not unusually high.
33. It was not unusually low.

Hudson, Lenawee Co., March, 1878. A. R. SMART, M. D.

REPLIES BY W. B. SOUTHARD, M. D., OF KALAMAZOO, MICH.

1.* Village, 12,000.
2. About 200.
3. Village and township of Kalamazoo.
4. Less, by one-fourth.
5. I should say the ratio was less.
6. Not any.
8. Dysentery, typhoid fever, and pneumonia.
9. To the unusually dry soil in the Fall and Winter of 1876–7; also to the same cause in the months of July and August, 1877.
10. Not any.
12. Dysentery, typhoid fever, and pneumonia.
13. Same reason as given in answer 9.
14. There was no high rate of mortality.
16. I have no means of knowing the number of cases; but there were comparatively few,—and of some, none at all.
17. Small-pox, cholera.
18. *January:* Influenza, remittent fever, diphtheria, scarlatina, pneumonia, consumption.
    February: Influenza, intermittent fever, remittent fever, pneumonia, diphtheria, rheumatism, consumption.
    March: Influenza, intermittent fever, pneumonia, bronchitis, consumption, puerperal fever.
    April: Intermittent fever, bronchitis, consumption, rheumatism.
    May: Intermittent fever, pneumonia, consumption, rheumatism.
    June: Intermittent fever, scarlatina, diphtheria, consumption.
    July: Intermittent fever, diarrhea, diphtheria, dysentery, scarlatina, consumption, measles.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

August: Cholera infantum, diarrhea, intermittent fever, remittent fever, cholera morbus, dysentery.

September: Intermittent fever, remittent fever, diarrhea, cholera infantum, typho-malarial fever, diphtheria.

October: Intermittent fever, remittent fever, typho-malarial fever, diphtheria.

November: Intermittent fever, remittent fever, typho-malarial fever, diphtheria, consumption.

December: Intermittent fever, remittent fever, typho-malarial fever, diphtheria, scarlatina, consumption.

19. None, in our locality; but 8 to 12 miles north-east of us, hog cholera prevailed to quite an extent, during August and September, causing quite a loss to farmers. This was confined to Gull Prairie.

21. Excellent.
22. Not noticeable.
23. Yes.
24, 25. Less.
27. July and August were the driest.
28. July and August.
29. April, May, October, and November.
30. On valley plains, 10 to 20 feet; on prairies, 60 to 100 feet.
32. April and October.
33. July and August.

Kalamazoo, Kalamazoo Co., March 1, 1878. W. B. SOUTHARD, M. D.

REPLIES BY H. C. CLAPP, M. D., OF MENDON, MICH.

1.* About 800.
2. 10.
3. Village of Mendon, and a radius of five miles.
4. About the same as during the previous four years.
5. Same as compared with previous four years.
6. None.
8. Malarial.
9. To drainage of contiguous marshes, and the breaking up of no more virgin soil.
10. Not any.
12. Malarial.
13. To the fact mentioned in answer 9.
14. None specially. Two children died of diphtheria in one family in March; two old, broken-down persons, man and wife, died of pneumonia the last of April; two children, of diarrhea the first of September; two, of consumption, one in May, and the other in September; one primiparous woman, of puerperal eclampsia in April; one young lady, of cerebro-spinal meningitis the first of August; one child, of infantile convulsions in September; an imbecile, of suicide; and there were some other unimportant cases—an average rate.
15. Cerebro-spinal meningitis, the first of August.
16. Of scarlet fever, 1; of typhoid fever, 1: of measles, 20 (estimated); of whooping-cough, 100 (estimated); of cerebro-spinal meningitis, 1; of diphtheria, 15: there were none others of a contagious, endemic, or epidemic character.
17. Small-pox and cholera.
18. *January:* Whooping-cough, bronchitis, pneumonia, intermittent fever, remittent fever, rheumatism.

February: Bronchitis, whooping-cough, pneumonia, remittent and intermittent fevers, rheumatism, influenza.

March: Pneumonia, bronchitis, whooping-cough, intermittent and remittent fevers, measles, diphtheria, rheumatism, mumps.

April: Pneumonia, bronchitis, intermittent and remittent fevers, measles, mumps.

May: Measles, bronchitis, intermittent and remittent fevers, pneumonia.

June: Intermittent and remittent fevers, measles, bronchitis, pneumonia, rheumatism, consumption.

July: Intermittent and remittent fevers, rheumatism, bronchitis, diarrhea, consumption.

August: Intermittent and remittent fevers, diarrhea, bronchitis, dysentery, consumption.

September: Intermittent and remittent fevers, diarrhea, dysentery, bronchitis, rheumatism, consumption.

October: Intermittent and remittent fevers, bronchitis, diarrhea, whooping-cough, rheumatism.

November: Intermittent and remittent fevers, bronchitis, rheumatism, pneumonia, whooping-cough, influenza.

December: Bronchitis, intermittent and remittent fevers, whooping-cough, pneumonia, rheumatism.

19. Horses had "distemper" to a limited extent, during the latter part of February.
20. All in good condition, so far as I am informed.
21. The usual good condition.
22. No.
23. Yes.
24. Less.
25. Less than usually.
27. Dry months,—February, April, June, July, August, September. Wet months,—January, some wet; March, a good deal of snow; May, October, November, December, considerably wet.
28. February, April, August.
29. May, November, December.
30. About 16 feet; it does not vary much throughout the village.
31. I did not observe it monthly.
32. November, December.
33. February, July.

Respectfully submitted,

Mendon, St. Joseph Co., Feb., 1878. H. C. CLAPP, M. D.

REPLIES BY C. W. BACKUS, M. D., OF THREE RIVERS, MICH.

1.[*] Incorporated village,—3,000.
2. About 21.
3. Three Rivers, St. Joseph Co., Mich.
4. **Less**; I do not know how much less, but only estimate.
5. **Less**; I do not know how much less.
8. Malarial diseases.
9. The year 1877 has been unusually healthy with us; there were no extremely dry months; the streams were not very low, as they are some seasons; and the Summer months were not hot; there were no extremes of heat and cold, and the result was we had much less of malarial diseases than has been common in this vicinity. Most of our diseases are malarial.
12. Malaria.
13. Not much malaria being generated.
15. Small-pox, January 7, 1877.
16. Of small-pox, 1 case; of scarlet fever, 4 cases; of measles, 100 cases; of whooping-cough, 100 cases; of bilious remittent fever, 12 or 15 cases. These cases are estimated.
17. Cholera, typhoid fever, cerebro-spinal meningitis, diphtheria.
18. *February, March, and April:* Measles.

June, July, and August: Whooping-cough.

September, October, November, and December: Intermittent fever.

20. There was what is called the fly in the wheat crop, causing the crop to be short; but the quality was good.
21. Good, all kinds. Wheat good and grains plump and full.
22. No.
23. Yes.
24. Less. I heard no complaints during the past season.
25. I do not know; but farmers had difficulty in securing their hay, on account of rains at the time spoiling much of it.
28. August and September.
29. Spring months.
30. Distance to water in wells, 22 to 28 feet; they do not vary much; streams, 10 to 20 feet, and at some places less.
31. Streams remained high until the Fall months, when they become low; during October, November, and December they became high again; water in them was not very low at any time, as in some previous years.

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[*] The figures beginning paragraphs refer to questions in Circular 24, on pages 103-9 of this Report.

32. July, August, and September.
33. January, February, March, April, May, June, October, November, and December.

Respectfully submitted,

Three Rivers, St. Joseph Co., Feb. 22, 1878. C. W. BACKUS.

SOUTH-EASTERN DIVISION OF THE STATE.[*]

REPLIES BY W. H. ROUSE, M. D., OF DETROIT, MICH.

1. The population of Detroit is probably about 120,000.

2. 2,105, or about 18⅜ per thousand.

3. City of Detroit.

4. There has been probably 25 per cent less sickness than usual. It is impossible to give accurate figures.

5. Less. The interments, as reported by the officers of our city cemeteries, for the years 1875–6–7, were 2,321,—2,217,—and 2,105. This shows a marked decrease, though the city is constantly increasing in population. See tables of interments [pages 160–163].

6. Influenza—called diphtheria by some,—during the whole year; small-pox, during the first part of the year; and whooping-cough, the last part of the year. None of these have been very severe, nor so prevalent as to excite any alarm, except small-pox. In July, vaccinators were sent from house to house, by municipal orders, with instructions to vaccinate with bovine virus, all found in need. In a very short time we were entirely free from this loathesome disease. No cases have since been reported.

7. The small-pox was probably due to want of care in having every person properly vaccinated. From examination of many arms, and from re-vaccinating, I am convinced that many carry scars on their arms, supposed to be protective, while the vaccination (so called) never had protective qualities,—the sore being due to the instrument and substances applied, but not to vaccine. I can assign no especial cause for the other ailments.

8. All other diseases than those mentioned in answer 6.

9. Probably "hard times" has contributed as much as anything to the improved sanitary condition. Idleness and luxury are now confined to a small class. More attention seems to be devoted to hygienic laws, and better results may be expected.

10. Detroit has no method of registering the deaths that occur within its limits. By an ordinance amendatory of Sec. 12, Chap. 72 of Revised Ordinances of 1871, of the City of Detroit, approved Feb. 21, 1876, a certificate of death, stating name, age, sex, place of birth, residence, social condition (married or single), disease, and the time of death of the person to be interred, signed by "the attending physician, coroner, or a city physician," must be presented to the superintendent of the cemetery wherein the burial is to take place, before a burial permit can be issued. The superintendents of the cemeteries file with the city clerk monthly reports of the interments, and I have compiled the following tables from these reports now on file in the office of the city clerk. They are not accurate, as some who die in the country are brought here for burial, and some who die in the city are taken elsewhere for interment. They give only the number buried in the cemeteries, and will be good for comparison with similar reports.

The interments during 1877 are 112 less than in 1876, and 216 less than in 1875. There has been a decrease, from 1876, of 25 from accidents; 13 from Bright's disease; 20 from inflammation of brain; 47 from consumption; 77 from cholera infantum; 30 from debility; 19 from diarrhea; 45 from inflammation of the lungs; 54 still-born. The most marked increase is, from apoplexy, 13; meningitis, 26; softening of brain, 4; hydrocephalus, 10; bronchitis, 9; cancer, 19; diptheria, 24; typhoid fever, 9; heart disease, 10; old age, 15; scarlatina, 57; small-pox, 52; suicide, 6. The number of still-born, 131, though 54 less than that of the previous year, seems excessively high. It is probably due, in part at least, to the common habit of using ergot too freely, especially by uneducated midwives, and by accouchers who have not time to wait, or ability to use instruments. The number of deaths from diseases of the brain, 135; from spasms, convulsions, etc., 173; from consumption, 163; from cholera infantum, 148; and from scarlatina, 75,—seems high, though less than the average. The 49 from "debility," and 61 from "old age," are probably so reported for "want of better terms."

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[*] For counties in each division, see Exhibit 1, page 113.

TABLE A.—*Exhibiting for the City of Detroit, Michigan, by Months during the Year 1877, and for the Year 1876, the number of Interments and the reported Causes of Deaths, also the Increase or Decrease from each cause,—as compiled by W. H. Rouse, M. D., from monthly reports made, by Superintendents of Cemeteries, to the City Clerk.*

DISEASES AND CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.		DIFFERENCE.	
													1877.	1876.	Increase.	Decrease.
All Causes	185	152	178	171	176	148	249	237	153	148	150	158	2,105	2,217	......	112
Asthma	3	....	1	..	....	....	....	0	....	1	...	2	7	7	......	......
Accident	3	2	3	3	....	3	....	2	1	2	4	1	24	49	......	25
Asphyxia	1	...	....	1	1	....	....	....	....	....	....	1	4	4	......	......
Abscess	1	1	....	..	....	....	....	2	1	1	....	...	6	2	4	......
Apoplexy	1	1	....	2	2	2	5	3	2	....	2	2	22	9	13	......
Aphthæ	...	..	....	..	....	....	....	....	....	1	....	..	1	2	......	1
Bright's Disease	2	2	....	..	1	....	....	....	....	2	1	..	8	21	......	13
Brain, Inflammat'n of	2	2	2	5	4	1	2	3	....	2	....	2	25	45	......	20
Brain, Meningitis of	1	2	1	3	6	3	7	5	4	1	3	2	38	12	26	......
Brain, Tubercular Meningitis of	..	1	1	..	....	....	....	....	....	..	....	..	2	4	......	2
Brain, Softening of	..	..	1	2	....	....	2	1	2	..	1	1	10	6	4	......
Brain, Congestion of	..	5	2	5	2	1	4	4	2	2	4	3	34	41	......	7
Brain, Water on	3	..	1	2	1	3	4	2	2	1	2	4	25	15	10	......
Brain Disease	..	..	....	..	....	....	....	....	....	.	1	..	1	0	1	......
Bronchitis	6	3	3	2	4	3	2	1	3	.	4	..	31	22	9	......
Cancer	5	3	5	5	2	1	4	4	2	3	5	4	43	24	19	......
Cerebro-spinal Meningitis	..	2	2	..	....	....	....	....	....	.	....	..	4	2	2	......
Confinement, Childbirth	..	..	....	2	....	2	....	....	2	.	....	..	6	9	......	3
Congestion	..	1	2	..	....	3	....	3	....	2	1	1	13	20	......	7
Convulsions, Spasms, etc.	16	12	17	11	14	7	15	25	14	12	13	17	173	176	......	3
Croup	1	4	3	4	1	2	1	1	5	3	5	8	38	38	......	......
Consumption	14	11	18	20	18	7	19	11	9	15	8	13	163	210	......	47
Cholera Morbus	..	..	....	3	....	2	2	1	....	.	....	..	8	......	8	......
Cholera Infantum	..	..	....	1	....	2	64	59	17	4	1	..	148	225	......	77
Debility	5	4	3	1	3	1	6	6	7	6	2	5	49	79	......	30
Diphtheria	5	5	2	..	3	5	1	2	5	3	12	11	54	30	24	......
Diarrhœa	..	..	....	1	....	2	10	7	5	1	1	..	27	46	......	19
Dysentery	..	..	1	.	....	....	7	....	1	2	2	..	13	20	......	7
Dropsy	2	4	1	5	3	4	3	2	2	2	....	3	31	31	......	......
Died at Birth	1	..	....	.	....	....	....	1	1	.	....	..	3	5	......	2
Drowned	..	..	....	.	1	3	7	3	2	.	1	..	17	15	2	......
Diseases of Stomach	1	..	1	.	2	....	1	....	1	3	....	2	11	......	11	......
Erysipelas	..	..	...	3	2	....	1	....	1	.	....	..	7	......	7	......
Fever	1	3	1	1	....	....	....	1	1	2	2	..	12	......	12	......
Fever, Intermittent	..	..	....	.	2	....	....	1	1	1	....	..	5	10	......	5
Fever, Remittent	..	..	2	.	2	1	1	6	....	1	2	2	17	12	5	......

TABLE A.—CONTINUED.—*Interments in Detroit, in 1877 and 1876.*

DISEASES AND CAUSES OF DEATH.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.		DIFFERENCE.	
													1877.	1876.	Increase.	Decrease.
Fever, Bilious	1	1	....	...	3	....	....	1	1	....	1	..	8	4	4	......
Fever, Typhoid	3	..	4	4	1	10	5	5	10	3	3	1	49	40	9	......
Fever, Typhus	....	..	....	...	.	....	....	...	..	1	2	.	3	8	......	5
Fever, Typho-malar'l	....	..	....	...	.	....	....	...	1	....	....	.	1	......	1	......
Frozen	1	..	....	...	.	....	....	...	..	....	....	.	1	......	1	......
Gravel	1	..	....	...	.	....	....	...	..	....	....	.	1	......	1	......
Heart Disease	5	3	7	7	4	3	5	4	7	4	5	8	62	52	10	......
Heart, Dropsy of	....	..	....	...	.	....	....	...	1	....	....	.	1	5	......	4
Inanition	..	..	....	...	.	....	5	1	..	....	1	.	7	10	......	3
Insanity (Puerperal)	..	1	....	...	.	....	....	...	..	....	....	.	1	......	1	......
Liver Disease	..	1	....	1	.	1	....	3	..	1	2	1	10	17	......	7
Lungs, Various Diseases of	..	1	1	4	3	....	....	...	..	....	1	.	10	13	......	3
Lungs, Inflammation of	8	17	12	9	9	5	3	4	4	3	2	9	85	130	......	45
Lungs, Congestion of	5	1	7	2	1	1	2	1	1	2	2	2	27	28	......	1
Laryngitis	1	..	....	...	1	....	1	...	..	1	....	.	4	......	4	......
Marasmus	1	1	1	...	...	1	2	3	1	2	2	4	18	25	......	7
Measles	1	1	....	..	..	....	....	...	..	....	....	.	2	40	......	38
Nervous Exhaustion	1	..	....	1	..	....	....	..	..	....	2	1	5	......	5	......
Old Age	9	4	9	5	8	3	9	3	5	1	5	.	61	46	15	......
Paralysis	3	..	3	1	5	....	....	2	..	3	2	3	22	20	2	......
Pleuritis	....	1	....	1	..	2	....	..	3	2	2	.	11	10	1	......
Peritonitis	....	..	....	3	1	2	8	7	..	2	....	3	26	......	26	......
Puerperal Convulsions	1	1	....	..	1	....	1	..	..	....	....	..	4	3	1	......
Puerperal Fever	1	2	1	1	1	....	....	1	..	....	2	..	9	9	......	......
Pharyngitis	....	..	....	..	..	....	....	..	..	1	....	..	1	......	1	......
Premature Birth	....	..	....	..	..	....	5	3	..	....	4	2	14	......	14	......
Rheumatism	1	..	....	2	..	....	1	1	..	....	1	..	6	6	......	......
Scarlatina	3	4	6	4	4	8	7	8	8	8	5	10	75	18	57	......
Small-pox	28	14	10	10	19	16	6	3	..	1	....	..	107	55	52	......
Scrofula	1	..	....	1	..	....	1	..	..	....	....	..	3	8	......	5
Spinal Disease	4	..	1	1	1	....	1	..	..	....	....	1	9	8	1	......
Suicide	....	1	1	2	1	1	....	1	..	1	1	2	11	5	6	......
Still-born	12	15	12	11	15	16	8	6	6	10	12	8	131	185	......	54
Teething	....	..	....	2	..	1	....	4	2	2	....	....	11	21	......	10
Delirium Tremens	..	..	....	1	..	....	....	..	..	....	....	....	1	2	......	1
Tumors	..	..	1	2	2	1	....	..	1	....	....	....	7	7	......	......
Whooping-cough	1	..	....	..	1	....	1	3	2	4	....	1	13	21	......	8
Unknown	11	3	4	5	4	5	3	2	..	5	1	5	48	49	......	1
Miscellaneous	8	12	25	9	17	14	7	15	7	18	15	13	160	178	......	18

TABLE B.—*Interments in Detroit, by Months in 1877, 1876, and 1875; total Number of Interments for each of the years 1872–7 inclusive; and Comparisons of the several years.*

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.	More than in 1877.	More than in 1876.	More than in 1875.	More than in 1874.	Less than in 1873.
1877	185	152	178	171	176	148	249	237	153	148	150	158	2,105	....	....	....	....	401
1876	128	173	192	182	190	163	288	268	211	142	120	160	2,217	112	....	....	....	289
1875	189	168	178	170	177	165	319	244	220	176	146	169	2,321	216	104	....	....	185
1874	....	....	....	....	....	....	....	....	....	....	....	....	2,386	281	169	65	....	120
1873	....	....	....	....	....	....	....	....	....	....	....	....	2,506	401	289	185	120	....
1872	....	....	....	....	....	....	....	....	....	....	....	....	2,390	285	173	69	4	116

Population, as per State census in 1874,—101,245. Estimated population in 1877, about 120,000.

TABLE C.—*The Number of Persons, by stated Periods of Age and at all Ages, Buried in Detroit during the Year, and in each Month of the Year, 1877.*

AGES IN YEARS.	NUMBER BURIED, MONTHS AND YEAR.												
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	1877.
Under 1	45	44	47	38	38	35	105	103	49	33	35	43	615
1 to 2	9	11	11	8	13	4	24	38	13	13	8	9	161
2 to 3	9	8	6	10	6	4	4	6	9	9	6	10	87
3 to 4	8	4	5	4	5	5	7	6	3	1	6	7	61
4 to 5	0	1	2	4	4	5	6	3	2	4	5	6	42
5 to 10	12	6	12	13	13	8	4	9	12	9	9	10	107
10 to 20	12	3	7	7	7	7	15	10	9	8	8	3	96
20 to 50	37	34	35	45	39	42	37	30	20	33	37	30	419
50 upwards	39	23	39	41	28	14	36	25	25	23	24	24	341
Unknown	2	3	2	0	8	8	3	1	5	5	0	8	45
Still-born	12	15	12	11	15	16	8	6	6	10	12	8	131
All Ages	185	152	178	171	176	148	249	237	153	148	150	158	2,105

11.* There was no unusual mortality, except from small-pox. See answer 7.

12. See tables.

13. See answer 9.

14. There was nothing worthy of note during the year.

15. I had none.

16. I have no means of answering definitely. The tables of interments furnish some hints.

17. All have been reported.

18. The data are insufficient. See tables.

19–25. I am not familiar with the country. Disease occurred during a portion of the year among cattle; the grain and hay crops were good, and the potato crop fair, except the peachblows; but I can only speak in general terms.

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* The figures beginning paragraphs refer to questions in Circular 24, on pages 108-9 of this Report.

26. I have kept only a partial record. Dr. Leonard of this city furnishes a full report from the signal service.

27–33. I have kept no record. Our extensive sewers, though not properly drains, would have a tendency to keep the ground water about as low as the sewers.

34. If drainage pipes were laid with our sewers—the sewers being built of water-lime are expected to be impervious to water—the ground moisture would be much less, and the effect on the health of the people would be considerable. If both were laid at the same time, the extra expense would not be great.

From the nature of things, some of the above answers are mere guesses.

Yours truly,

441 Sixth Street, Detroit, Wayne Co., March 13, 1878. W. H. ROUSE, M. D.

REPLIES BY J. M. SWIFT, M. D., OF NORTHVILLE, MICH.

1.* Village of Northville; 1 section of territory; population, 900.
2. Deaths from all causes, 17.
3. Northville.
4. About an average; less, if any difference.
5. Same as last year; but there were more deaths than the average of years previous to last year.
6. Diphtheria, consumption, and old age.
7. I cannot give cause as unusual.
14. But epidemical diphtheria continued from latter part of 1876 most fatal during first part of the year 1877, in January and February. I give detailed account of deaths, and diseases of which they died,—rate, usual.

Deaths in Northville, Mich., 1877.

Date of Death, 1877.	Decedent.	Age of Decedent.	Disease or Cause of Death.	Remarks.
Jan. 17	A boy	9 yrs.	Diphtheria.	
Jan. 21	Mrs. Elliott	About 45 yrs.	Organic Disease of Liver	Probably Cirrhosis.
Jan. 26	Matie Gardner	11 yrs.	Diphtheria.	
Jan. 29	A boy	5 yrs.	Diphtheria.	
Feb. 8	A boy	4 yrs.	Diphtheria.	
Feb. 10	An infant			Particulars unknown.
Feb. 17	A girl	8 yrs.	Diphtheria.	
Feb. 26	P. S. Pennell	50 yrs.	Consumption	Died here; home in Ypsilanti.
April 5	Mr. Wood	73 yrs.	Unknown	Dropped dead.
June 30	Mrs. Savage	71 yrs.	Dropsy	Died here; home in adjoining village.
July 31	J. W. Linton	71 yrs.	Typhoid Pneumonia, Cystitis, and Debility.	
Aug. 2	A. Denslaw	25 yrs.	Consumption.	
Sept. 22	Infant (male)		Malnutrition, congenital	Disease entailed from mother, who nearly perished from same cause.
Oct. 25	Son of E. S. Horton.	7 mos.	Congenital Hydrocephalus.	
Nov. 12	Mrs. Durfee	67 yrs.	Cancer of Bowels.	
Nov. 18	Crom. Clark	78 yrs.	Consumption	Following Paralysis, of long standing.
Dec. 15	Frank Boothe		Killed	Thrown from carriage.

15. I cannot. The above answers the question as well as I can do it.
16. Of scarlet fever, 6 cases; of typhoid fever, 8 cases; of whooping-cough, 10 cases; of cerebro-spinal meningitis, 2 cases; of diphtheria, 40 cases.
17. Small-pox, cholera, and measles.

18*. *January and February:* Diphtheria, cerebro-spinal meningitis.
March and April: Diphtheria, scarlet fever.
May: Diphtheria.
July and August: Scarlet fever.
September: Typhoid fever, typhoid pneumonia.
October: Typhoid fever, typho-malarial fever.
November: Typho-malarial fever.
19, 20. None.
21. Good, first rate.
22. No.
23. Yes.
24. Not any.
25. Less.
26. I cannot.
27. I have no data.
28, 29. I have no data, though it was rather dry the entire season.
30. 40 feet for one-fourth part; 30 feet for one-half; 8 to 20 for one-fourth part.
31. I cannot tell.
32, 33. —.
34. I have nothing of importance to give.

Respectfully,
Northville, Wayne Co., Feb. 14, 1878. J. M. SWIFT.

REPLIES BY E. P. CHRISTIAN, M. D., OF WYANDOTTE, MICH.

1.* Probably about 3,000. The population has decreased since the depression of manufacturing industries.

2. Estimating the same ratio of deaths to amount of practice with other physicians as in my own, and half the number of deaths among Poles and Germans who employ no physicians, I estimate it at about 35 to 40. This is only guessing at it.

3. Corporate limits of city of Wyandotte. One and a half mile frontage by one mile nearly.

4. Less; 25 per cent.

5. About an average, estimating decrease of population.

6. Puerperal eclampsia in January, and cholera infantum in July and August.

7. I know of none.

8. Scarlatina, measles, and diphtheria, except in latter part of the year as regards scarlet fever and diphtheria, but then in mild form.

9. I know of no cause.

10. Puerperal eclampsia and cholera infantum.

11. I know of none, except there was an unusual number of infants being brought up on the bottle with cows' milk.

12. From scarlet fever and typhoid fever.

13. I know of none.

14. A higher than usual rate of mortality from cholera infantum in July and August.

15. No unusual diseases.

16. Of small-pox, none; of cholera, none; of scarlet fever, many; of typhoid fever, several; of measles, none; whooping-cough, general throughout community; of cerebro-spinal meningitis, none; of diphtheria, many.

17. Small-pox, cholera, measles, cerebro-spinal meningitis.

18. *January:* Bronchitis, rheumatism, remitting fever, typho-malarial fever, diphtheria, consumption, diarrhea.
February: Bronchitis, rheumatism, intermittent fever, remittent fever, diphtheria, consumption, diarrhea.
March: Bronchitis, whooping-cough, remittent fever, consumption, pneumonia, rheumatism, diarrhea, cholera morbus.
April: Bronchitis, rheumatism, diarrhea, consumption, intermittent fever, diphtheria, dysentery, erysipelas, typhoid fever.
May: Intermittent fever, whooping-cough, bronchitis, cholera morbus, consumption, diphtheria, remittent fever, rheumatism, erysipelas, diarrhea.
June: Intermittent fever, whooping-cough, bronchitis, pneumonia, remittent fever, typhoid fever, dysentery, cholera morbus, rheumatism.
July: Intermittent fever, whooping-cough, remittent fever, diarrhea, dysentery, cholera morbus, diphtheria, pneumonia.

August: Intermittent fever, cholera infantum, cholera morbus, diarrhea, dysentery, remittent fever, diphtheria, whooping-cough.

September: Intermittent fever, remittent fever, diarrhea, cholera infantum, dysentery, diphtheria, rheumatism, cholera morbus, scarlatina, consumption.

October: Intermittent fever, remittent fever, dysentery, diarrhea, cholera infantum, rheumatism, consumption, pneumonia, scarlatina, whooping-cough.

November: Intermittent fever, remittent fever, diphtheria, diarrhea, dysentery, rheumatism, consumption, scarlatina. pneumonia, whooping-cough.

December: Diphtheria, scarlatina, rheumatism, diarrhea, dysentery, typho-malarial fever, consumption, intermittent fever.

19–25. I know of no disease among animals; and as regards grains, the miller here says that the entire grain crop of 1877 was harvested in better condition than in any year he remembers.

26. I have no records to which to refer, but the records kept by Dr. Leonard, of Detroit, will answer for this locality.

27. I cannot give a statement for each month of year; but owing to flatness of land and slight elevation above level of river, the soil moisture depends upon amount of rainfall and evaporation. Hence the wells are always fuller in Spring and Fall, many giving out in July, and dry from that to October; also sometimes dry in Winters. None gave out last or this Winter, and but few in the Summer of last year. The amount of evaporation has a very noticeable effect, by raising or lowering the water in the river, a difference in elevation of two or three feet or more in different seasons being caused by this alone, and this affecting soil moisture; also, heavy easterly storms, damming up the river and causing a temporary elevation of several feet,—westerly winds lowering it correspondingly. The water averaged higher last Summer than usual.

28. At no time unusually so.

29. There was more moisture in soil the whole year through; but, as said above, most in Spring and Fall.

30. From one to ten or twelve feet.

31. It is impossible for me to give an opinion, as I have no specific data.

32. Highest in Spring and Fall, except as affected by winds.

33. Lowest in Summer, except as affected by winds, etc.

34. —.

Wyandotte, Wayne Co., Mich. E. P. CHRISTIAN, M. D.

Further statements relative to the diseases in Michigan in 1877 are given in the article on "Weekly Reports of Diseases," on pages following, where the rise and fall of some of the diseases by months in 1877, is graphically represented in diagrams. Statements relative to the temperature, humidity, atmospheric pressure, rainfall, cloudiness, and atmospheric ozone, in different parts of the State, are given in the article on "The Principal Meteorological Conditions in Michigan in 1877," on subsequent pages of this Report, where diagrams may be seen which represent to the eye the principal meteorological conditions in different parts of the State during the several months of the year 1877, and which render it easy to compare the diseases with the meteorological conditions existing at the same time, and with those in the month preceding.

A STUDY OF THE

CLIMATE AND TOPOGRAPHY

OF THE

LOWER PENINSULA OF MICHIGAN.

BY

HENRY F. LYSTER, A. M., M. D.,

OF DETROIT, MEMBER OF THE MICHIGAN

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON CLIMATE, ETC.

A STUDY OF THE CLIMATE

OF THE LOWER PENINSULA OF THE STATE OF MICHIGAN.

BY HENRY F. LYSTER, A. M., M. D., DETROIT.

The definite knowledge of the climate of a given locality is the foundation for a correct observation of the different forms of disease as they prevail among the people. Without this, all results of statistical work are lacking in the most essential features which make them applicable in extending and confirming our study of disease.

It is well known that certain forms of climate are the direct causes of consumption to certain races; also that in peculiar climates peculiar forms of disease are prevalent to the exclusion, as it were, of other forms. Rheumatism prevails in climates where there are great changes in the diurnal temperature, as in elevated and mountainous regions, particularly where there is exposure to the weather. Malarious fevers are found where the temperature is elevated in a moist atmosphere, and a comparatively rapid decomposition of organic matter is, as a consequence, taking place.

Let these striking forms of disease suffice to illustrate the fact that, for purposes of a comparative study of disease, and, as a consequence, the furtherance of the interests of the public health, a full and complete observation of the climate in each locality is absolutely necessary.

In this paper an attempt is made rather to lay the groundwork for future study and observation, than to complete the subject. A large amount of material has been appropriated and made use of, representing the result of many years' patient work on the part of a number of different observers, and without which nothing could have been undertaken. Toward the close of this paper, time and opportunity will be better afforded to institute comparisons between the forms and amount of sickness as indicated by the death-rate prevailing in Michigan and neighboring States.

Climate is the atmospheric condition of a region. This is determined, in a general way, in any locality by the distance from the equator, and by the elevation above the level of the sea. The peculiar climate of any place is modified by many circumstances other than these, which will be more particularly noticed as we proceed in the study of this subject.

All the external physical and natural circumstances connected with any particular region, which influence in any way the atmosphere and modify its temperature, will influence and determine the climate. The effects of climate depend upon its temperature, humidity, and the force and direction of the prevailing winds. For the reason that the climate peculiar to any given locality is modified by all external agencies that influence the temperature and other qualities of the atmosphere, it becomes necessary to study each one of these physical and natural conditions as presented in this State, in order to found a correct understanding of the subject.

The geological construction of the State may very properly be first considered.

The conditions of the lower strata of the atmosphere depend largely upon the character of the earth upon which it rests and over which it moves. Not only their temperature, but the amount of moisture which they contain, as well as the character and quality of their impurities, are influenced by this.

The condition and depth of the ground water, that living fresh-water sea beneath our feet, which exists at a variable depth under the surface of the whole earth, always and constantly moving down the subterranean water-sheds to the natural water-courses and the ocean, determine, to a greater or less degree, both the temperature and humidity of the lower strata of the atmosphere, as well as their degree of impurity; its distance from the surface will depend somewhat upon the geological formation in which it is found. The quantity and chemical constituents of the potable waters obtainable from the underlying formations are very decidedly influenced and changed by the geological formations through which they pass.

The ability of the animal system to undergo, without deleterious consequences, the changes of atmospheric conditions is materially influenced by the quality of the water used; and it will be apparent from this alone, that the study of the geological condition is an essential element in the study of climate, particularly as regards its influencing the public health.

The composition and character of the soil and subsoil well deserve careful consideration, on account of the large amount of decomposing vegetable matter they contain, as well as in regard to the possibility of their relief by drainage.

The geological conditions determine largely the quantity and kind of the vegetation, also the extent and proportion of prairie and of forest, each of which influences in different ways the temperature, humidity, and wholesomeness of the climate.

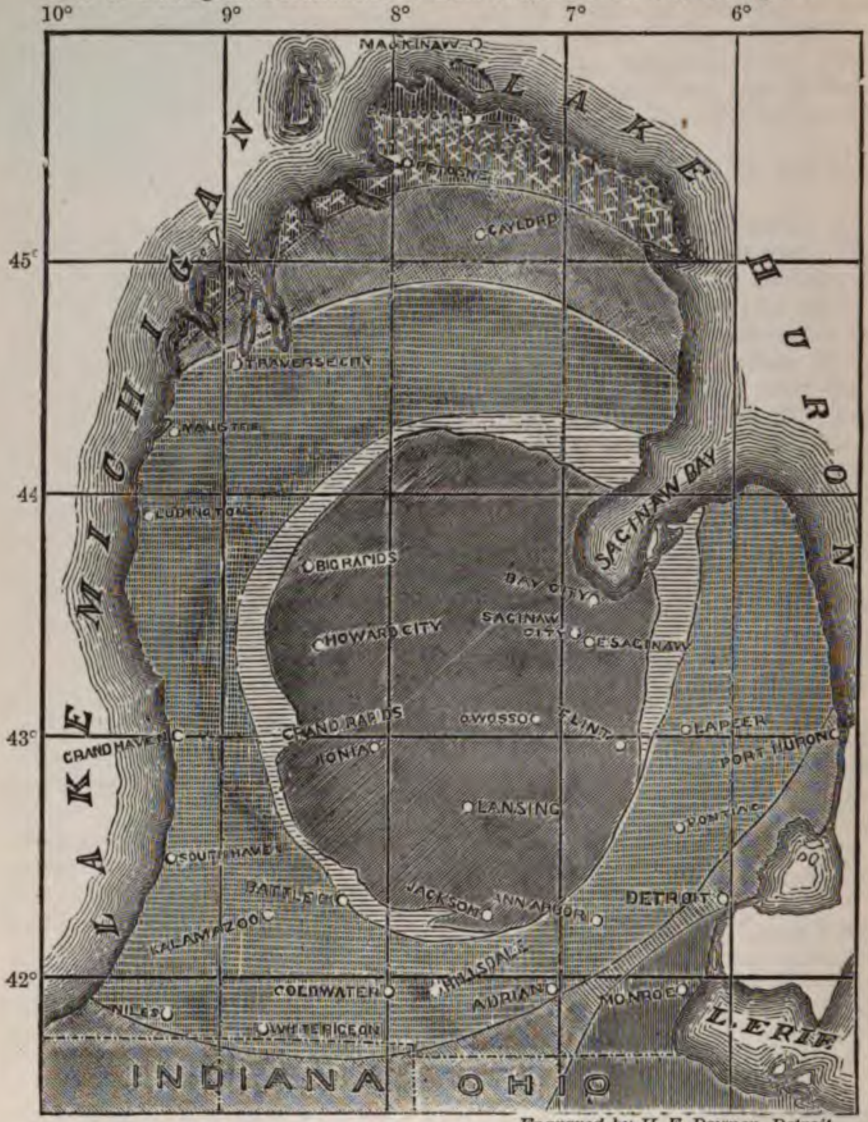
The Lower Peninsula of this State differs so entirely from the Upper Peninsula, in its physical conditions as well as in its climate, that the committee has preferred to consider them separately and to devote the first paper to the portion of the State south of the Straits of Mackinaw, through which the waters of Lake Michigan flow into those of Lake Huron.

GEOLOGY.—(*Map I., page 172.*)

The geology of this State has long been made a subject for study by a number of eminent scientific men, among whom we may particularly mention Dr. Douglas Houghton, Prof. A. Winchell, Dr. C. Rominger, Major T. C. Brooks, and Prof. Raphael Pumpelly. Prof. A. Winchell and Dr. C. Rominger have given more special attention to the geology of the Lower Peninsula. This half of the State extends from the northern boundaries of Ohio and Indiana, in latitude 41° 70′ N., and from longitude 5° 30′ to 9° 50′ W. of Washington, and embraces about thirty-five thousand square miles.

In determining the proper classification of the different formations, some differences of opinion may obtain as regards the extent and scientific classification

MAP I.—Geological Formations of the Lower Peninsula of Michigan.



Engraved by H. E. Downer, Detroit

I. Geological Map of the Lower Peninsula of the State of Michigan, after Dr. C. Rominger, State Geologist, published by authority of the Legislature, under the direction of the Board of Geological Survey, 1876.

▥	Helderberg Group.	▦	Waverly Group.
▩	Hamilton Group.	▤	Carboniferous Limestone.
▒	Black Shale.	▨	Coal Measures.

For comments on this map, see pages 170, 173.

of one or two of the underlying rock-formations, due chiefly to the fact that the depth of the drift which overlies the base rocks of the whole peninsula has prevented in many localities the intimate study of the underlying strata.

The accompanying geological map has been reduced from that drawn by Dr. C. Rominger, State Geologist, and published in 1876 by authority of the Legislature of the State of Michigan, under the direction of the Board of Geological Survey.

The peculiar encyclical character of the rock-formations, first pointed out by Prof. Winchell, of the University of Michigan, Director of the Geological Survey, will be at once noticed. The lowest stratum found on the lower peninsula, known as the Helderberg group of limestones, is seen in the south-east corner of the State, reaching from Detroit to the Ohio border and extending in an arc twenty miles west from Lake Erie. The same group appears at Cheboygan, Bois-Blanc Island, Mackinaw, McGulpin's Point, and Waugoshance Island, all in the Straits of Mackinaw, extending on the main land across the northern boundary of Cheboygan and Emmet counties, and varying in width from two to five miles.

The Hamilton group of limestones, a more recent formation, appears at the head of Thunder Bay, and reaches across the State to Sleeping Bear Point and the Manitou Islands, in a belt about twenty miles in width.

The Black Shale extends from about latitude 44° 30′ on Lake Huron and 45° on Thunder Bay, in a belt of about the same width, to Lake Michigan between latitude 44° 30′ and four or five miles south of Sleeping Bear Point. In the lower portion of the State, the same formation will be found, between Detroit and latitude 43° 10′ on Lake Huron, extending in an arc west of the Helderberg limestones into Ohio and Indiana and re-appearing in the southwestern corner of the State, about twenty miles east of New Buffalo.

The Waverly sandstones occupy the space between the Black Shale, and the Coal Measures and Carboniferous Limestones, completely encircling the two last mentioned.

The Carboniferous Limestones are found between the sandstones and the coal, in most of the circle within which the latter appears.

The Coal Measures extend northerly from the central portion of Jackson county to the southerly portion of Roscommon county, and westerly from the center of Tuscola county to the eastern border of Muskegon county; that is, from 42° 15′ to 44° 15′ north latitude, and from 6° 30′ to 8° 45′ longitude west from Washington. These groups are given in the order of their depth, the Helderberg being the lowest, and the Coal Measures the highest of the rocks; namely,—(1.) Helderberg Limestone; (2.) Hamilton Limestone; (3.) Black Shale; (4.) Waverly Sandstone; (5.) Carboniferous Limestone; (6.) Coal Measures.

Over the whole of these sedimentary rocks, covering the entire extent of the Lower Peninsula, may be found the drift, which is generally of great depth. The drift was deposited by water and glaciers, and consists of a *débris* of rock of almost every degree of division, much of which has been deposited in well-stratified layers, which are shown in railroad cuts and on the banks of several of the rivers.

The rivers do not cut through the drift deposits, except in a few cases where the base rock is found near the surface, as the lower portion of the River Raisin, at Monroe.

A dense stratum of clay, impervious to water, determines usually the depth of the ground water, and, covered by a shallow deposit of sand and gravel, it affords, in most instances, a bottom for the river-system of the State.

TOPOGRAPHY.—(*Charts II., III., IV., V., VI., VII, pages 175, 179–187.*)

The surface configuration of the Lower Peninsula has been well described, in the absence of a topographical survey, by both Prof. Winchell and Dr. Rominger, in their reports upon the geological survey of the State, and in other published papers. These descriptions have been determined chiefly by railroad surveys of the numerous lines which traverse the State in all directions, particularly in the lower four tiers of counties.

The committee has relied upon the railroad surveys to show the general elevation of the land, remembering the fact that these do not give either the highest or the lowest elevations, for the reason that surveys of this character are made as nearly upon levels as the route determined upon will permit, for reasons which are obvious to every one.

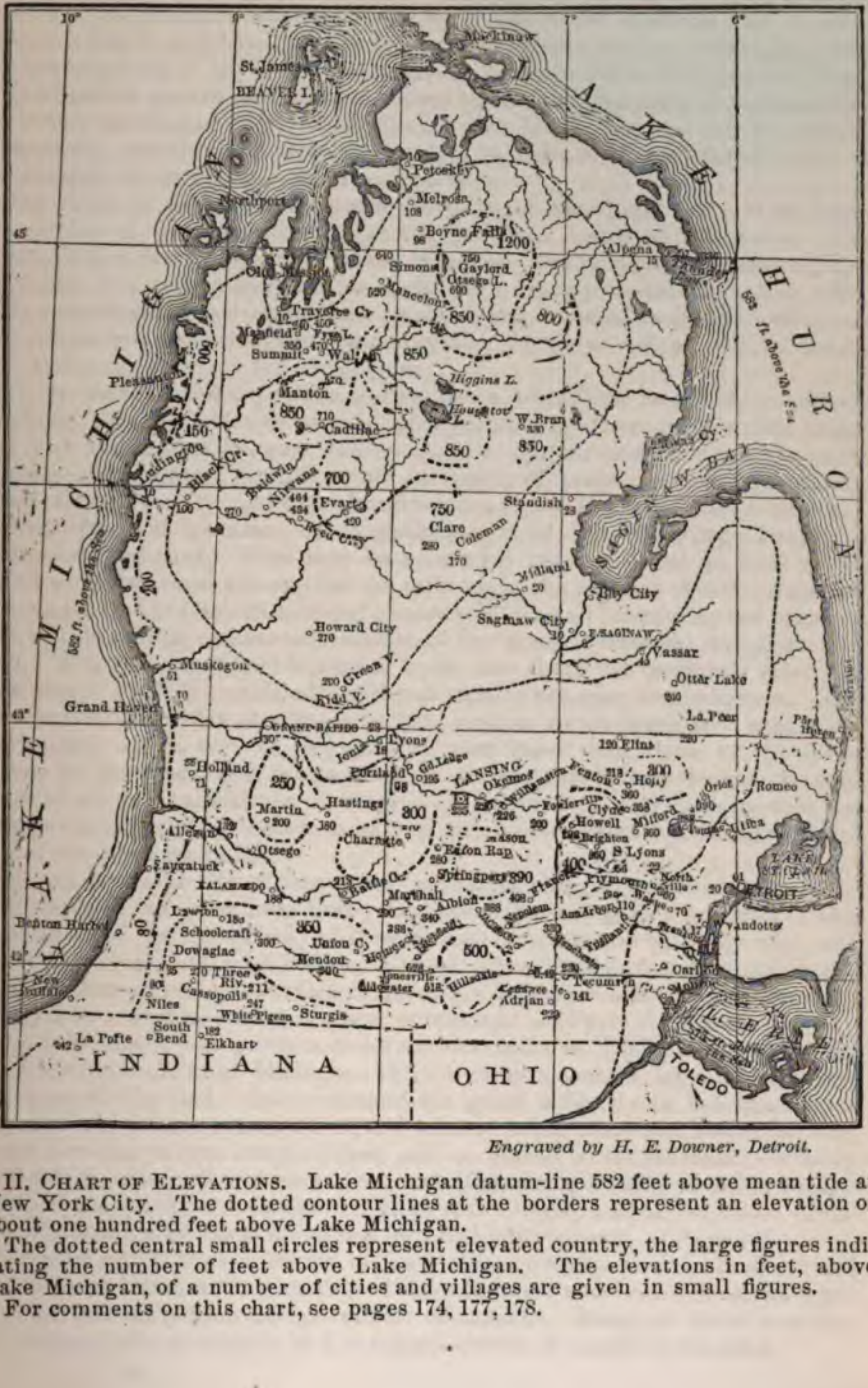
The river-system of the State will, if carefully traced out upon the map upon which it is shown, give the general outline of the higher plateaux and divides, or water-sheds.

Upon the accompanying chart is given the elevation of many of the principal cities and villages, determined by the railroad surveys. There are also shown a number of summits whose elevations and locations have already been described by Prof. Winchell. These so-called summits are simply the culminations, tracts or districts of land, representing the greatest altitude in their vicinity, and are usually elevated plateaux rather than hills. The larger-sized figures indicate the average height, in feet, of the summits, which are somewhat irregularly outlined by dotted curves. The smaller figures show the height, in feet, of the several cities and villages to which they are attached. "And all of those south of the dividing valley of the Saginaw and Grand rivers represent tillable and fertile farms." (Chart II., page 175.)

Arising in Tuscola county, south-east of Saginaw Bay, and extending in a south-westerly direction through Lapeer, Oakland, Livingston, Washtenaw, Jackson, Lenawee, and Hillsdale counties, is a rise of ground dividing the water-sheds of all that portion of the State lying south of the Saginaw and Grand River valley. The rivers run off from this divide eastward into Lake Huron, River St. Clair, Lake St. Clair, Detroit River, and Lake Erie, northward into Saginaw Bay, and westward across more than one-half of the State into Lake Michigan. Rising about four hundred feet in Tuscola and Sanilac counties, it reaches five hundred feet in Lapeer and Oakland counties, four hundred to four hundred and fifty feet in Livingston, Washtenaw, Jackson, and Lenawee counties, and five hundred to six hundred feet in Hillsdale county. There is a large hill in north-western Lenawee county, in the town of Cambridge, known as "Michigan Heights," which in all probability reaches an altitude of over six hundred and fifty feet above Lake Michigan. The "Bunday Hills," in the township of Summerset, in Hillsdale county, rise to an estimated height of between six hundred and thirty (Winchell) and seven hundred feet above Lake Michigan. This height of ground falls away a few miles south of the Indiana line.

The State survey for the Michigan Southern Railroad route, made in 1837, determined, two miles west of Hillsdale, an elevation on the line, of six hundred and thirty-one feet above Lake Erie.—(Blois.) This would be equivalent to six hundred an twenty-two feet above Lake Michigan, which has been taken as the datum for elevations on this chart.

CHART II.—Contour Lines, and Elevations of the Surface of the Lower Peninsula.



Engraved by H. E. Downer, Detroit.

II. CHART OF ELEVATIONS. Lake Michigan datum-line 582 feet above mean tide at New York City. The dotted contour lines at the borders represent an elevation of about one hundred feet above Lake Michigan.

The dotted central small circles represent elevated country, the large figures indicating the number of feet above Lake Michigan. The elevations in feet, above Lake Michigan, of a number of cities and villages are given in small figures.

For comments on this chart, see pages 174, 177, 178.

It will be within the power of the committee, in the course of a few months, to decide the question regarding the exact height of the southern tier of counties, as a line is now being surveyed and triangulation stations established, under the direction of the U. S. Lake Survey, between lakes Michigan and Erie.

In Hillsdale county, and within a space of four miles square, five rivers take their rise, the Maumee and Raisin flowing into Lake Erie, and the St. Joseph, Kalamazoo, and Grand finding their way into Lake Michigan, respectively, at St. Joseph, South Haven, and Grand Haven.

The valley of the Saginaws meets the valley of the Grand River in the eastern portion of Gratiot county, near the meridian center of the State. The height of this divide is given by Prof. Winchell at seventy-two feet above Lake Michigan, determined by the State survey for a trans-peninsular canal, in 1836.

By referring to the contour lines on the chart, intended to show an elevation of one hundred feet, the extent and direction of these valleys will be shown with sufficient accuracy for our purpose.

To the north of this depression the peninsula, which may be called, commonly speaking, the new and undeveloped portion, rises up from the dividing valley and from the littoral margins, as shown by the contour lines, and reaches, in its culminating height of land, a known elevation of seven hundred and ninety feet in Otsego county, and eight hundred and thirty feet in Wexford county.

Prof. Winchell estimates the highest ranges of hills in Otsego county at twelve hundred feet. This may be somewhat too high; but we have determined by the railroad survey that the rails are at the altitude of seven hundred and ninety feet at Gaylord in Otsego county; and in all probability the range of hills in this vicinity reaches an elevation of two or three hundred feet above this level. The heights of land indicated upon the chart are generally after the estimates of Prof. Winchell, although not strictly adhering to his figures. The elevations of the different villages in this section, which have been accurately determined, will be seen to be greater in most cases than those of the lower portion of the State, and substantiate, to a very satisfactory degree, the estimates of the general altitude of the face of the country, and indicate that the average elevation of the northern half of the Lower Peninsula is nearly twice that of the southern half.

"Sand dunes, or hills of loose sand, are found along the coast of Lake Michigan, south of Sleeping Bear Point, in some places rising to the height of two hundred feet. In the vicinity of New Buffalo they are thirty, forty, fifty, and ninety-three feet; at Grand Haven, two hundred and fifteen feet at their highest. Back of these dunes the surface is generally depressed and not unfrequently occupied by a marsh, lakelet, lagoon, or estuary."—(Prof. Winchell.)

Prof. Winchell has given a chart of elevations in Tackabury's Statistical and Descriptive Atlas of Michigan, 1873, on which contour lines are given for elevations of fifty feet. On account of the great difficulty in following these with the eye, I have contented myself with showing a contour line at an estimated elevation of one hundred feet, and certifying to the increased elevation of all points within the contour line, and illustrating this by showing the determined elevations of a number of cities and villages, and an estimated elevation of a number of tracts of rolling land or high plateaux. (Page 175.)

Included within the boundaries of the State are five thousand one hundred and seventy-three lakes, having an area of seven hundred and twelve thousand eight hundred and sixty-four acres.—(Prof. Winchell.) Many of these are surrounded partially or entirely by a marginal border of marsh or wet land.

"The amount of swamp, boggy, and overflowed lands is estimated at 8,570 square miles, of which about 500 have been reclaimed, and about 800 more partially reclaimed to agriculture. It is believed that nearly all the swamp and wet lands of the State are susceptible of drainage. It is estimated that in the last ten years more than 20,000 miles of ditching have been dug in the State."—[Am. Public Health Association Report, 1876, pages 26 and 27.]

The soils formed upon a drift deposit are liable to the greatest variation, and on account of their depth are usually very desirable. They vary from the stiff clay as represented about Detroit and Monroe, to the sand on the coast of Lake Michigan and of the high plateau of Roscommon and Crawford counties. In general, it may be called a gravelly loam upon the higher portions of the State, with clay bottom lands in the more depressed localities.

It will be seen from the chart of the surface configuration, and by the description given of the geological construction of the Lower Peninsula, that while there is a decided elevation of the surface of the country above the surrounding lakes, and an abundant river-system or natural drainage, there are no mountainous ranges or abrupt elevations to influence the direction and force of the winds, or modify the temperature and rainfall, and by these means impress upon the climate a peculiar character. Rising as the land does from the littoral margins at the lakes in gently undulating plains and plateaux, with hills here and there of moderate size, to a general central elevation of between three hundred and eight hundred feet, with the exception of the Saginaw and Grand River valley, through its whole meridian length, the climate is but little influenced, as regards its temperature and rainfall, by the physical condition of the surface of the country. In studying the surface configuration of the State, with the aid of the railroad elevations as shown upon Charts III., IV., V., VI., VII.,* it will be seen that the valley of the Saginaw and Grand River divides, as described in the text, the southern from the northern portion of the Lower Peninsula. This is shown upon the profiles of the Detroit and Milwaukee R. R., the Flint and Pere Marquette R. R., the Jackson, Lansing, and Saginaw R. R.,† and the Grand Rapids and Indiana R. R.

The Jackson, Lansing, and Saginaw,† and the Flint and Pere Marquette Railroads cross it at Saginaw where it is but eight feet above the lake; the Detroit and Milwaukee, at Ionia and Grand Rapids; and the Grand Rapids and Indiana R. R., also at Grand Rapids, where it is thirty-five feet above the lake. The Oakland Co. summit is well shown upon the profile of the Detroit and Milwaukee R. R., and also upon that of the Flint and Pere Marquete R. R. The Osceola Co. summit is also shown upon the latter railway. (Pages 179, 181.)

The Wexford Co. and the Antrim Co. summits are shown upon the profile of the Grand Rapids and Indiana R. R., as well as the comparative elevation of the lower and the upper portions of the Lower Peninsula. (Pages 183, 187.)

The profile of the Jackson, Lansing, and Saginaw R. R. shows the Jackson Co. and Ingham Co. summit and also those of Roscommon, Crawford, and Otsego counties. (Saginaw and Mackinaw Division of the M. C. R. R., page 181.)

The profile of the Detroit, Lansing, and Northern R. R. (page 181) shows the Washtenaw Co. summit, and a narrow portion of the Grand River Valley at Ionia.

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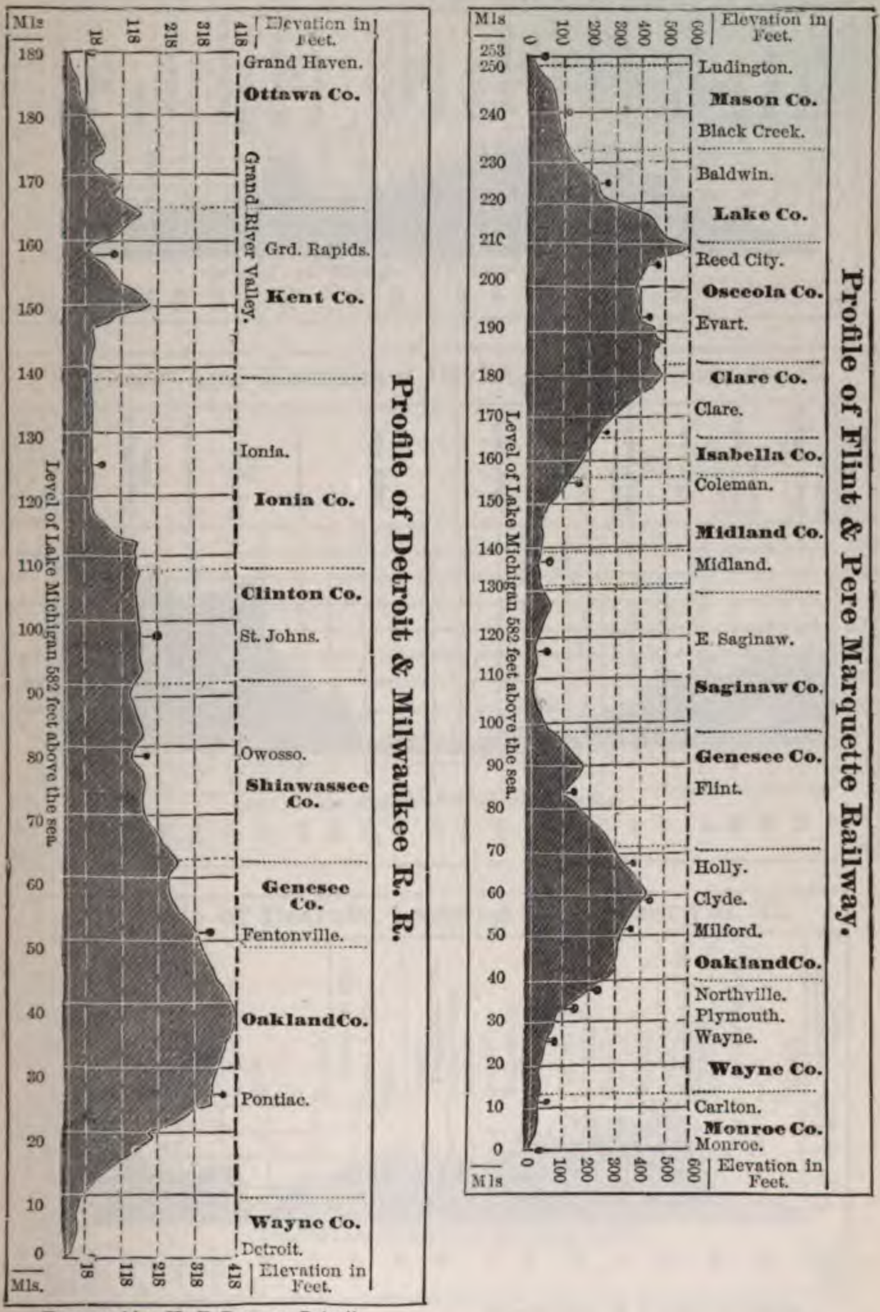
* III., IV., V., VI., VII. TOPOGRAPHICAL CHARTS of the elevations of the surface, as determined by railroad surveys (pages 179–187). These charts are all upon the scale of ten miles horizontally in each rectangular space to one hundred feet vertically to each space at the ends of the chart. This proportion must be held constantly in mind in observing the profile. The upper edge of the profile represents the actual line of the rails.

† In Chart IV., page 181, included under the head,—Saginaw and Mackinaw Division, *Mich. Cent. R. R.*

CHART III.—Profiles of the Flint & Pere Marquette and Det. & M. Railroads.

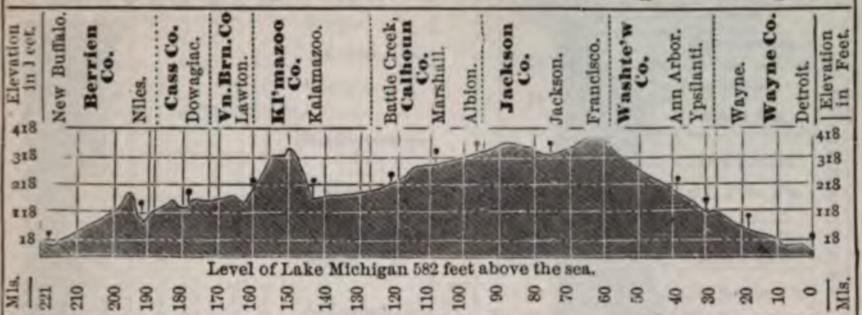


Engraved by H. E. Downer, Detroit.

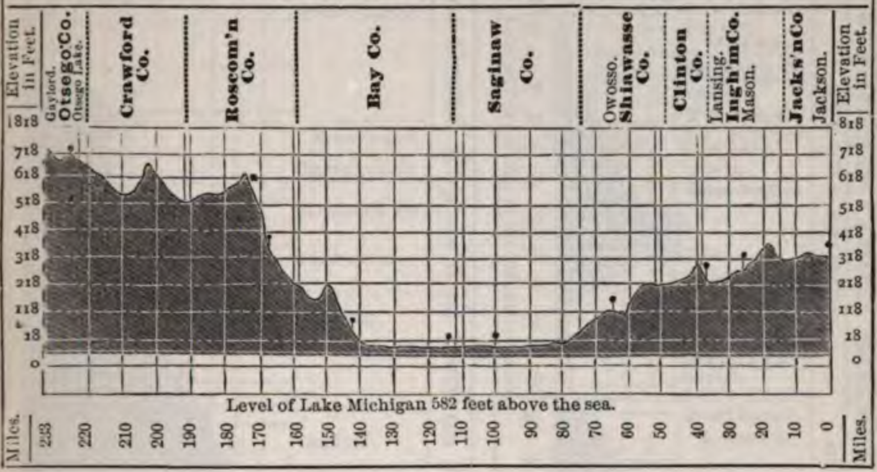
For explanations of this Chart, see foot-note on page 178; for comments, see page 178.

CHART IV.—Profiles of the Mich. Central and the D., L., & Northern Railroads.

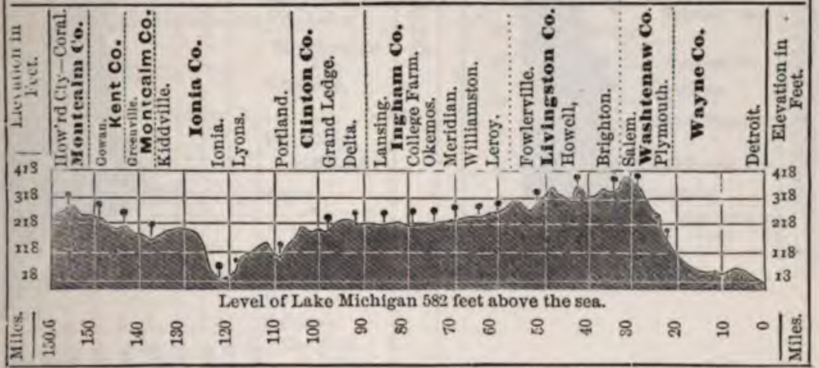
Profile of Michigan Central R. R. through Michigan.



Saginaw and Mackinaw Division Mich. Cent. R. R.



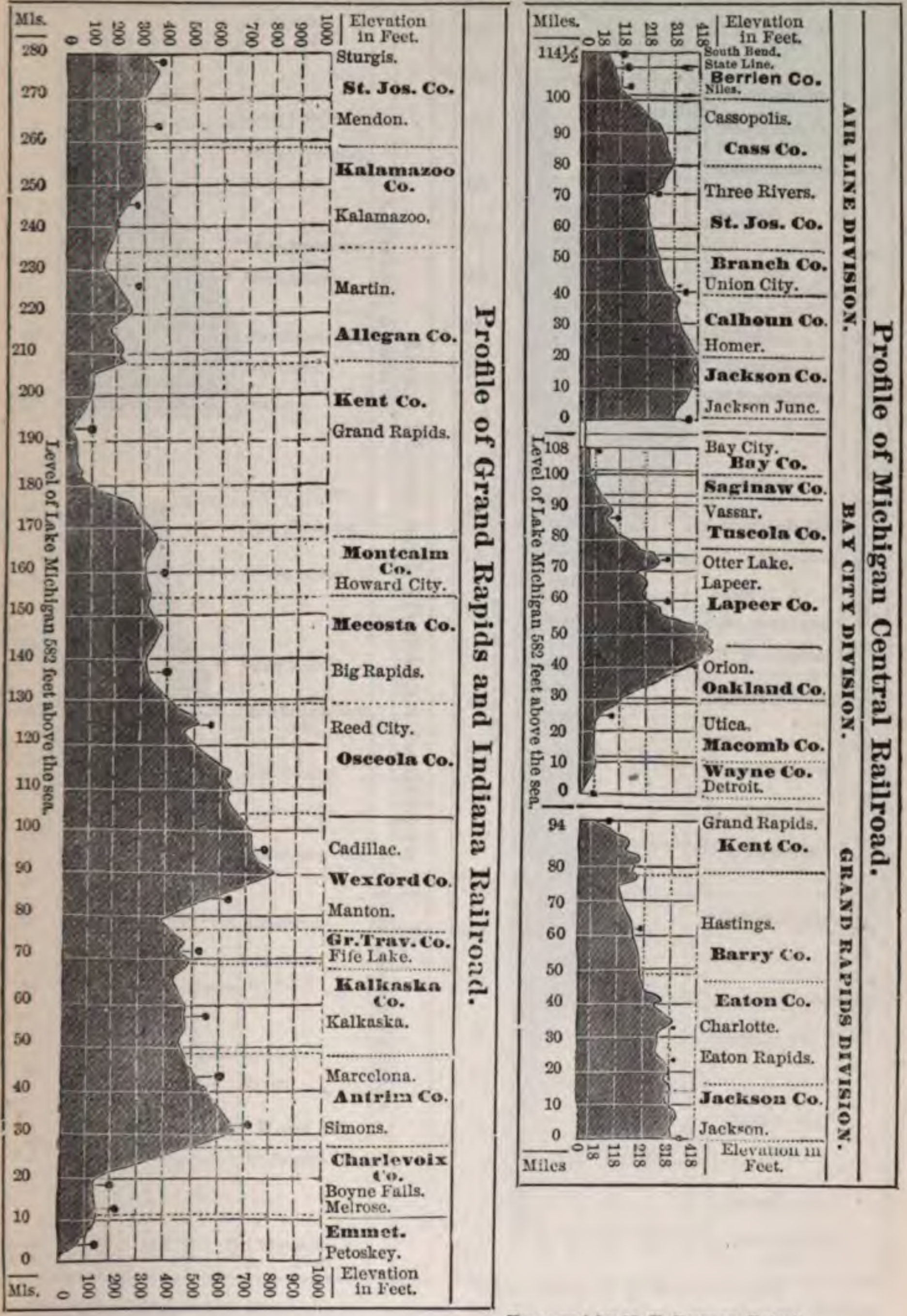
Profile of Detroit, Lansing & Northern R. R.



Engraved by H. E. Downer, Detroit.

For explanation of this Chart, see foot-notes on page 178; for comments, see pages 178, 179; for profiles of other divisions of the Michigan Central R. R., see page 183.

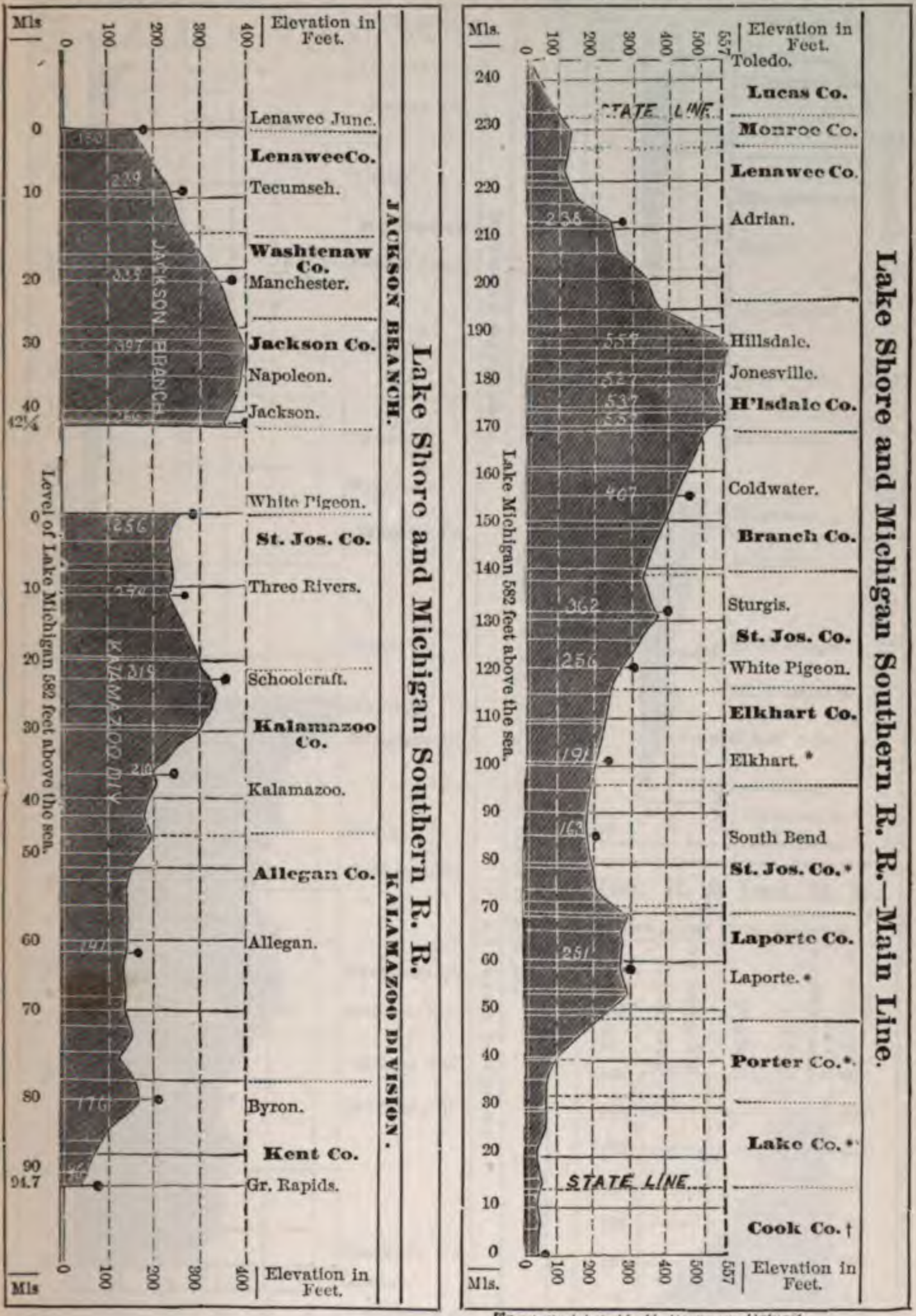
CHART V.—Profiles of the Mich. Central and the Gd. Rapids & Ind. Railroads.



Engraved by H. E. Downer, Detroit.

For explanations of this Chart, see foot-notes on page 178; for comments, see pages 178, 191; for profiles of other divisions of these roads, see pages 181, 187.

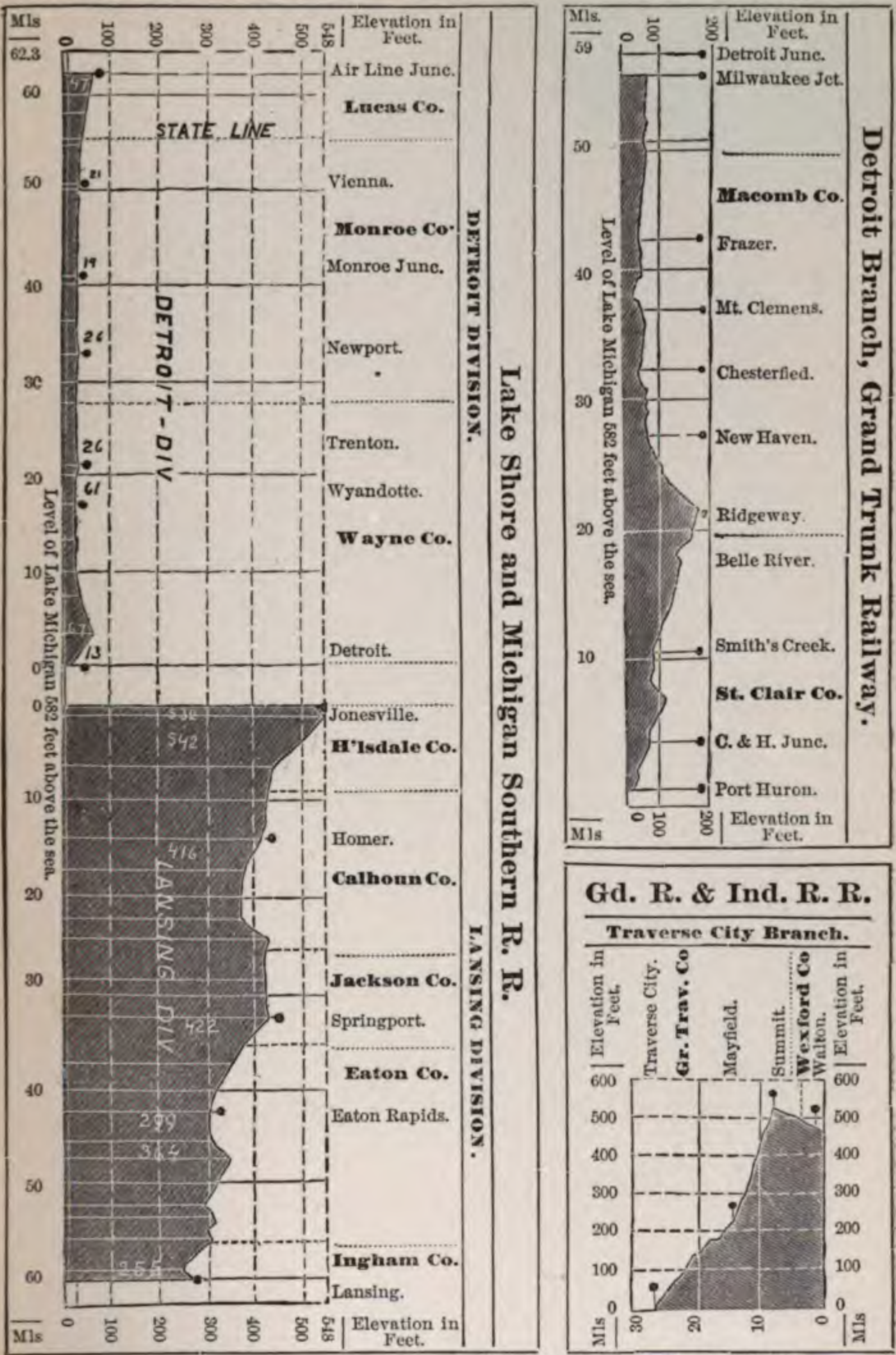
CHART VI.—Profiles of the Lake Shore & Michigan Southern Railroad.



Engraved by H. E. Downer, Detroit.

For explanations of this Chart, see foot-notes on page 178; for comments, see page 191; for profiles of other divisions of this road, see page 187.
* Indiana. † Illinois.

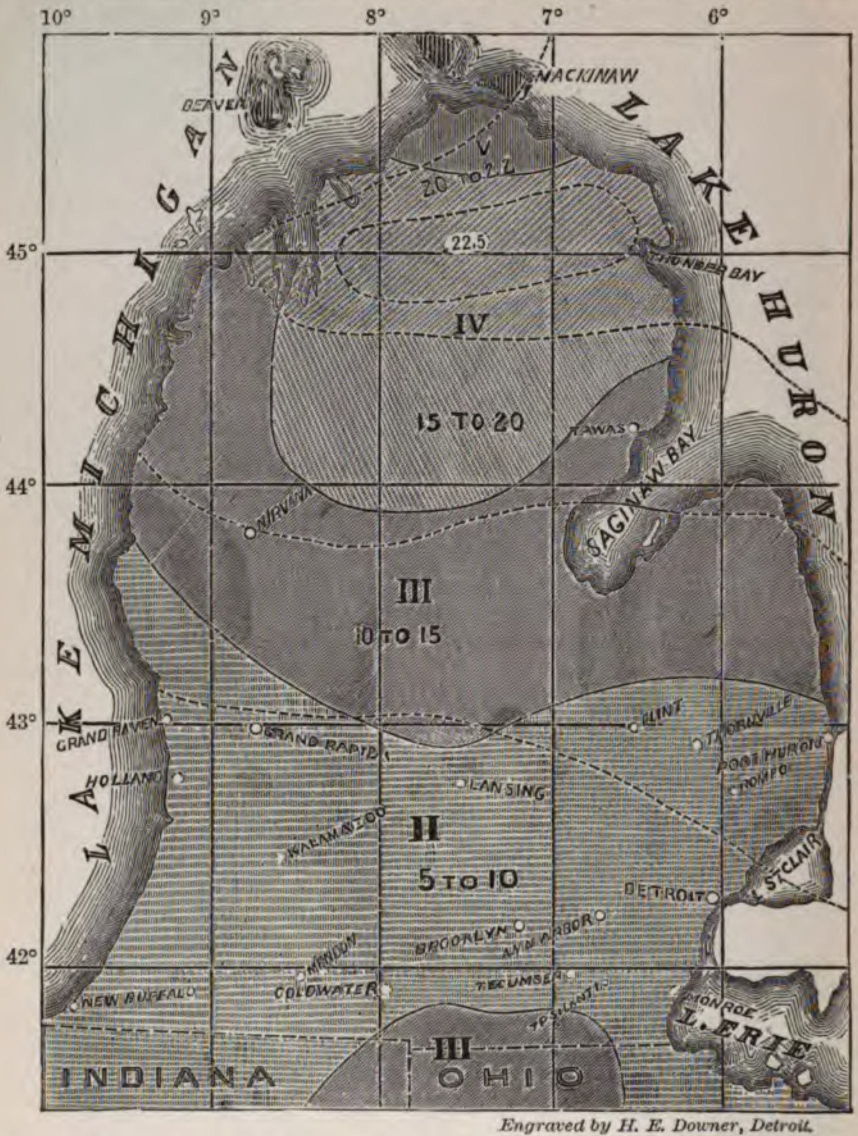
CHART VII.—Profiles of the L. S. & M. S., the G. T., and the G. R. & Ind. Railroads.



Engraved by H. E. Downer, Detroit.

For explanations of this Chart, see foot-notes on page 178; for comments, see pages 178, 191; for profile of the main line of the Grand Rapids & Indiana R. R., see page 183.

MAP VIII.—Distribution of Woodland, and Frequency of Storm Centers.



Engraved by H. E. Downer, Detroit.

VIII. Map Showing, in Five Degrees of Density, the Distribution of Woodland in the Lower Peninsula of Michigan, 1873, (after Prof. Brewer, Hartford, Conn.) The tracts to which the Roman numerals (II., III., IV., V.) apply are shown by the shading of the map.

I. 40 to 120 acres of woodland to the square mile.
II. 120 to 240 acres of woodland to the square mile.
III. 240 to 360 acres of woodland to the square mile.
IV. 360 to 560 acres of woodland to the square mile.
V. 560 and over 560 acres of woodland to the square mile.

The Frequency of Storm Centers, deduced from recorded observations for 1871 and 1872, by U. S. Signal Service, U. S. A., is indicated by Arabic numerals, which state for these years, the annual average of the number of areas of low barometer, not including local thunder or hail storms. The dotted lines bound the tracts to which the Arabic numerals apply.

For comments on this map, see page 191.

The profile of the Michigan Central R. R. shows the gradual slope of the land, with the Jackson Co. summit at Francisco, as well as one in Kalamazoo Co.

The profile of the Air Line Division of the Michigan Central R. R. shows a fall of over 200 feet between Jackson and Niles. (Page 183.)

The profile of the Grand Rapids Division of the Michigan Central R. R. shows a fall of over 300 feet between Jackson and Grand Rapids, showing that Jackson is upon the highest plateau of the southern portion of the Lower Peninsula. (Page 183.)

The profile of the Lake Shore and Michigan Southern R. R. shows the same gentle elevation towards the center of the State. Unfortunately the engraving was drawn reversed, and this was not corrected by the engraver. In viewing this chart, it would be well to imagine that one is looking at it from the north. The height of land in Hillsdale Co. is well shown on this profile. (Pages 185, 187.)

The profile of the Kalamazoo Division shows the gentle inclination of land from White Pigeon, 275 feet elevation, to Grand Rapids, 35 feet. (Page 185.)

On the Jackson Division the rise between Lenawee Junction to the city of Jackson is over 200 feet. (Page 185.)

FORESTS.—(*Map VIII., page 190.*)

With the exception of a small amount of prairie in the south-western portion of the State, and the marshes upon the borders of the inland lakelets, the whole country was originally covered with a forest of greater or less density, oak openings in the south, and pine and other evergreens in the north, together with all the varieties of trees and shrubs common to this latitude and inland position. The accompanying map is intended to show the amount of woodland contained within the State at a recent period. With whatever correctness it may have been constructed, it will become less accurate each year on account of the constantly increasing destruction of the forests, in the process of clearing up the farms by immigrants, as well as by the older residents, for firewood and fences, and in the manufacturing of lumber. We have not as yet reached that point of enlightenment at which we counteract the destruction of the timber through the State, by planting trees, or even by preserving trees standing on the borders of the prospective field or roadway. The sanitary value of trees will be referred to in another connection.

The great pine forests extend from the latitude of Flint and Grand Haven over the whole of the upper portion of the State, intermingled to a greater or less extent with beech and maple on the clay land, together with hemlock, spruce, linden, balm, cedar, and other varieties of northern trees.

The Storm Chart which appears on the Woodland Map (VIII., page 190) is designed to show the frequency with which the centers of areas of low barometer, assumed to average fifty miles in diameter, have passed over any given district. It does not include local thunder or hail storms. It shows the annual average for two years ending February, 1873. The observations upon which it has been constructed were made by the Signal Service Corps, U. S. A. The committee has not been able to correct this chart to date. The observations of the past five years might have altered it somewhat, and would certainly have diminished materially the error that exists in so short a period of record. This chart shows the comparative frequency of storms on the high plateaux of the upper portion of the Peninsula.

This chart is of service in connection with statistical observation of diseases that originate in sudden changes of weather which attend storms, and has been taken from the "Statistical Atlas of the United States."

METEOROLOGY.—(*Charts VIII., IX., X., XI., pages 190, 194, 197, 201.*)

The seasonal temperature of the lower atmosphere of the State is considerably modified by the presence of the Great Lakes, which form its natural boundary upon three sides, while the mean annual temperature is not greatly affected by them. Large bodies of water, such as oceans and seas, have decided effects upon the atmosphere of adjacent lands, influencing it in some countries several hundred miles from the shore.

The warm surface currents coming up from the equatorial regions of the Pacific produce an elevation of the mean temperature of the western coast of Washington Territory, lying in latitude 47°—49° north, corresponding to that found at Detroit and Boston in latitude 42° north, an elevation of from 8° to 10° F. above the same parallel east of the immediate influence of the ocean, about the 100th parallel of longitude west from Greenwich.

We see the same general effects of the Atlantic and its currents upon the climate of Western Europe. The British Isles, in latitude 50°—51° north, have a mean temperature of 48°, which is that of Adrian and Detroit; while the winter is warmer by 16° and the summer is cooler by 8° in Great Britain.

The mean range of temperature on the Pacific coast between the extreme seasons is only 4°, while upon the Atlantic coast it is 33°. This is accounted for from the fact that the warm currents of wind and water set toward the western coast of the continent, and away from the Atlantic coast. Michigan, occupying a central continental position, is still to some extent affected by the distant ocean. Our westerly winds would have a lower temperature than they possess in the winter, after crossing the plains of Iowa and Wisconsin, were it not that the Pacific winds carried over into the valleys of Montana some of the heat which was latent before the excess of moisture was deposited upon the western slope of the Rocky Mountains. From the Carribean Sea and the Gulf of Mexico come up the currents of air laden with moisture to be deposited in rain and snow, modifying, to a certain extent, our temperature.

Large bodies of water heat less rapidly than do land surfaces, and they also cool less readily. By this means the lower atmosphere is subjected to less sudden and frequent changes, and becomes cool more slowly and heated less rapidly when passing over them.

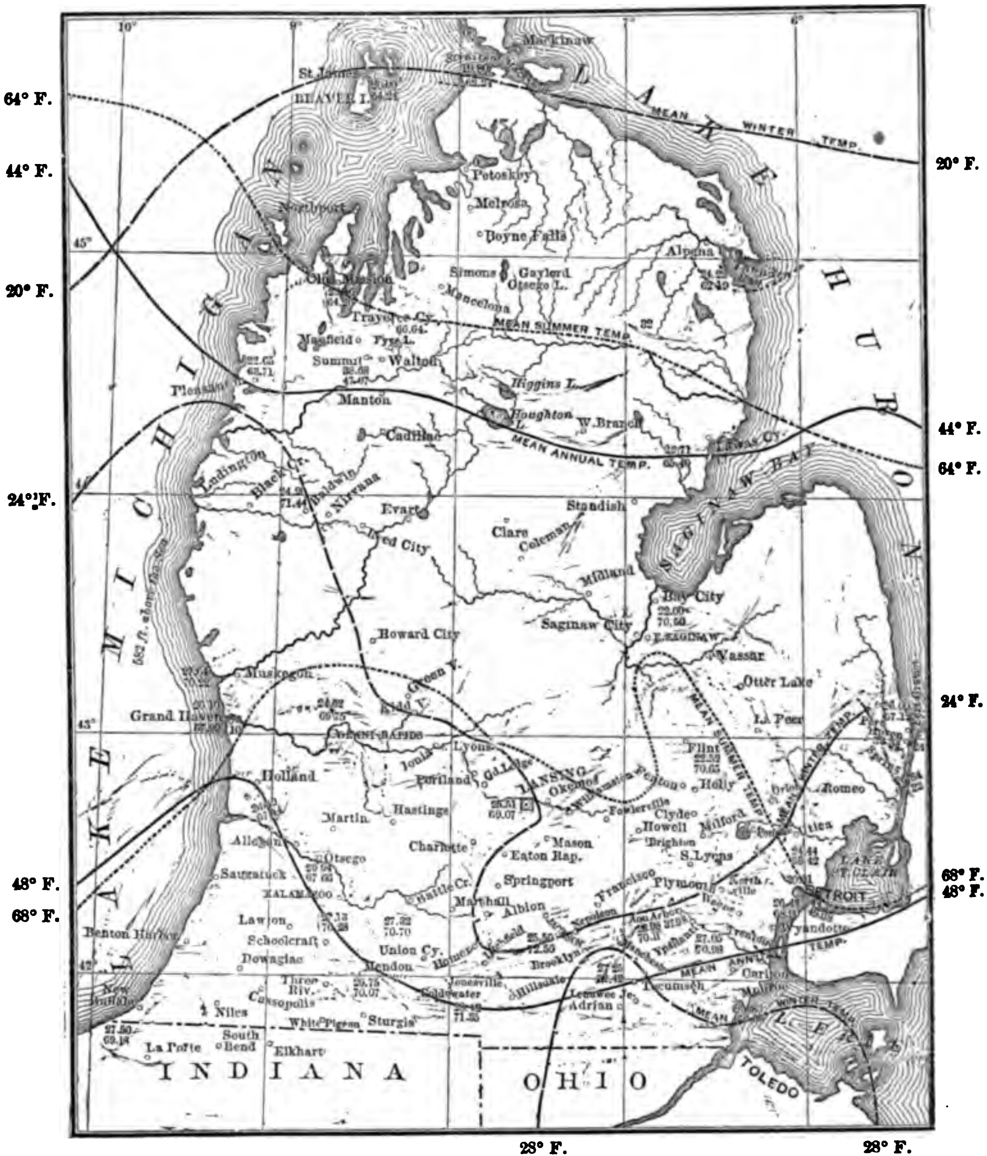
The Great Lakes influence more particularly the seasonal temperature than the mean of the whole year. They raise the temperature in winter an average of 10° F., and lower it in summer about 5° F.

Our winter winds, coming as they usually do from the west, from over the snow-fields and frozen prairies of Dakota, Iowa, Illinois, and Wisconsin, are moderated in their temperature in passing over the warmer surface of Lake Michigan, which remains unfrozen for the most part, with the exception of cakes of floating ice near the shore, and reach our western coast tempered to the extent of a mean of 4° F. The spring and autumn winds are also elevated to the extent of 2½° F. to 3° F. in their respective seasons. This renders the growing season two weeks longer, and also preserves the vegetation from the late frosts of spring, and early frosts of autumn.

The influence of Lake Michigan upon the temperature of the atmosphere of its surrounding country is felt upon its Wisconsin border to an appreciable extent.

The temperature of the atmosphere is not wholly determined by the winds from the west. This is shown by the fact that the atmosphere upon the western coast of Lake Michigan is influenced to some extent inland by the lake.

CHART IX.—Mean Winter, Mean Summer, and Mean Annual Temperature.



Engraved by H. E. Downer, Detroit.

IX. TEMPERATURE CHART of the Lower Peninsula of Michigan, showing by isothermal curves, the distribution of the mean Annual, mean Winter, and mean Summer temperature of the lower atmosphere.

The mean Annual isothermal is represented by ————————

The mean Winter isothermal is represented by — — — — — —

The mean Summer isothermal is represented by …………

In connection with the names of localities, the upper numbers indicate the average winter temperature; and the lower numbers, the average summer temperature.

For comments on this chart, see page 195.

From isothermal curves published by I. A. Lapham, LL.D., of Milwaukee, 1865, the mean January temperature at Milwaukee, in lat. 43° north, is shown to be 22.20° F., the equivalent of which is not found north of the 42d parallel on the Mississippi River. That of Green Bay Peninsula, in the county of Door, in latitude 45° 10′ north, is found at the mouth of the Wisconsin, on the Mississippi River, in latitude 43°. The July mean temperature at the Lake, of 71° F., (latitude 42° 45′) just below Milwaukee, crosses the Mississippi at latitude 45° 20′ north.

Prof. Winchell first pointed out the peculiar climatic condition of western Michigan, extending from New Buffalo to Grand Traverse.

The isothermal curves, upon Charts IX. and X. (pages 194 and 197), for the different degrees of temperature indicated, will show more readily than any description, the influence of the neighboring lakes upon the temperature of the atmosphere of the State. Whatever imperfections these may possess, the continuance of observations will permit of their correction in time. These charts, have been, with some modifications, determined from Prof. Winchell's isothermal charts, 1873, also from observations collected by the Smithsonian Institution and arranged by Chas. A. Schott, assistant in the Coast Survey, and published under the direction of Professor Henry, Secretary, 1876, as well as from the Signal Service, U. S. A., and from records by observers for this Board.

Upon these charts the mean seasonal temperature has been designated by figures, the superior number in Chart IX. indicating the mean winter temperature and the inferior number indicating the mean summer temperature. The superior figures on Chart X. indicate the mean spring temperature; and the inferior, the mean autumn temperature.

The mean annual isotherm of 44° F. will be seen to enter the eastern coast of the State at latitude 44° 12′, and with a gradual elevation reach Lake Michigan at lat. 44° 30′. (Chart IX, page 194.)

The mean annual isotherm of 48° F. crossing the Detroit River at Grosse Isle, in lat. 42° 5′, tends in a south-westerly direction to the vicinity of Coldwater, where it turns upward to the north-west, and leaves the State at Holland, in latitude 42° 45′. (Chart IX., page 194.)

According to Prof. Winchell, the mean annual temperature of 44° F. enters the State as already described, and leaves it, after dividing near Grand Traverse Bay, in lat. 44° 45′ and at 45°. The isotherm of 48° enters at the mouth of Detroit River, and after dividing a few miles back from Fenton, leaves the State near South Haven, in lat. 42° 30′.

The mean winter isotherm of 28° F. enters below Monroe, and passing in a north-westerly direction for forty or fifty miles, suddenly turns south and leaves the State at longitude 7° 30′ W. from Washington. (Chart IX., page 194.)

The winter isotherm of 24° F. enters at Fort Gratiot, in latitude 43°, and tends south-west to the vicinity of Coldwater, then bends up to the north-east and turning north of Lansing and continuing north of Grand Rapids, it leaves the State below Pleasanton, about latitude 44° 20′, fully two degrees of latitude, equal to one hundred and thirty-nine miles, further north than Coldwater.

The winter isotherm of 20° skims across the northern part of Cheboygan and Emmet counties from Presque Isle to the Beaver Islands in Lake Michigan.

The summer isotherm of 68° F. enters at Detroit and tends north-west beyond Flint, where it turns south to Howell, then north-westerly to the meridian of Grand Rapids, where it tends south-westerly to Grand Haven. (Chart IX.)

The summer isotherm of 64° F. enters above Tawas City, lat. 44° 24′, and going north-westerly, leaves at Manitou Islands, lat. 45°. (Chart IX., page 194).

The spring isotherm of 45° F. divides, as it enters the State, at the mouth of the Detroit River, one line extending south-west by west beyond Coldwater, the other going north by north-west; passing above Pontiac and Flint, it turns to the south-west and becomes reunited west of Coldwater, when passing north-west it leaves the State at Holland. (Chart X., page 197.)

The spring isotherm of 43° F. enters at Port Huron, in lat. 43°, and leaves at latitude 44°. (Chart X., page 197.)

The spring isotherm of 40° F. enters at Tawas City, lat. 44° 15′, and leaves at Sleeping Bear Point, lat. 44° 50′. (Chart X., page 197.)

The spring isotherm of 38° F. enters below Thunder Bay, lat. 44° 50′, and dividing, one line tends south-westerly until it reaches the middle meridian, then north-westerly to Grand Traverse Bay, and then north to the Beaver Islands, where it unites with the other line which skirted the coast. (Chart X.)

The autumn isotherm of 50° F. enters at the Ohio line, lat. 41° 45′, and reaching west to Coldwater tends north-west above Saugatuck, lat. 42° 43′.

The autumn isotherm of 49° F. enters above Detroit, lat. 42° 20′, divides very much after the manner of the spring isotherm of 45° F., and leaves the State at Ludington, lat. 44°. (Chart X., page 197.)

The autumn isotherm of 47° F. enters at White Rock, lat. 43° 40′, tends north-west, passing Tawas City, Grand Traverse Bay, and the Beaver Islands, in lat. 45° 50′. (Chart X., page 197.)

In a comparison of the mean annual temperature of Michigan with that of other portions of the United States, it will be found that the differences in elevation overcome several degrees of latitude. Taking the temperature of 48° F., the annual mean of Southern Michigan, the isothermal curve will pass through Boston, Mass., East Tennessee down the Blue Ridge to lat. 35°, Chicago, Council Bluffs (1023 feet elevation), Denver, (5350 feet elevation, lat. 40°), and Santa Fe (6846 feet elevation, lat. 35°), New Mexico.

The isotherm of 44° F., the mean annual temperature of Tawas City and Manistee, passes through Maine, Plattsburg, N. Y. (lat. 44° 50′), Northern Illinois, Southern Wisconsin, Northern Montana, Utah, and part of Nevada.

The mean winter temperature of 28° F., that of southern Lenawee and southern Monroe counties, equals that of Columbus, Ohio (lat. 40°), Springfield, Ill. (lat. 40°), Southern Idaho and Oregon, and Pennsylvania, except the mountain region.

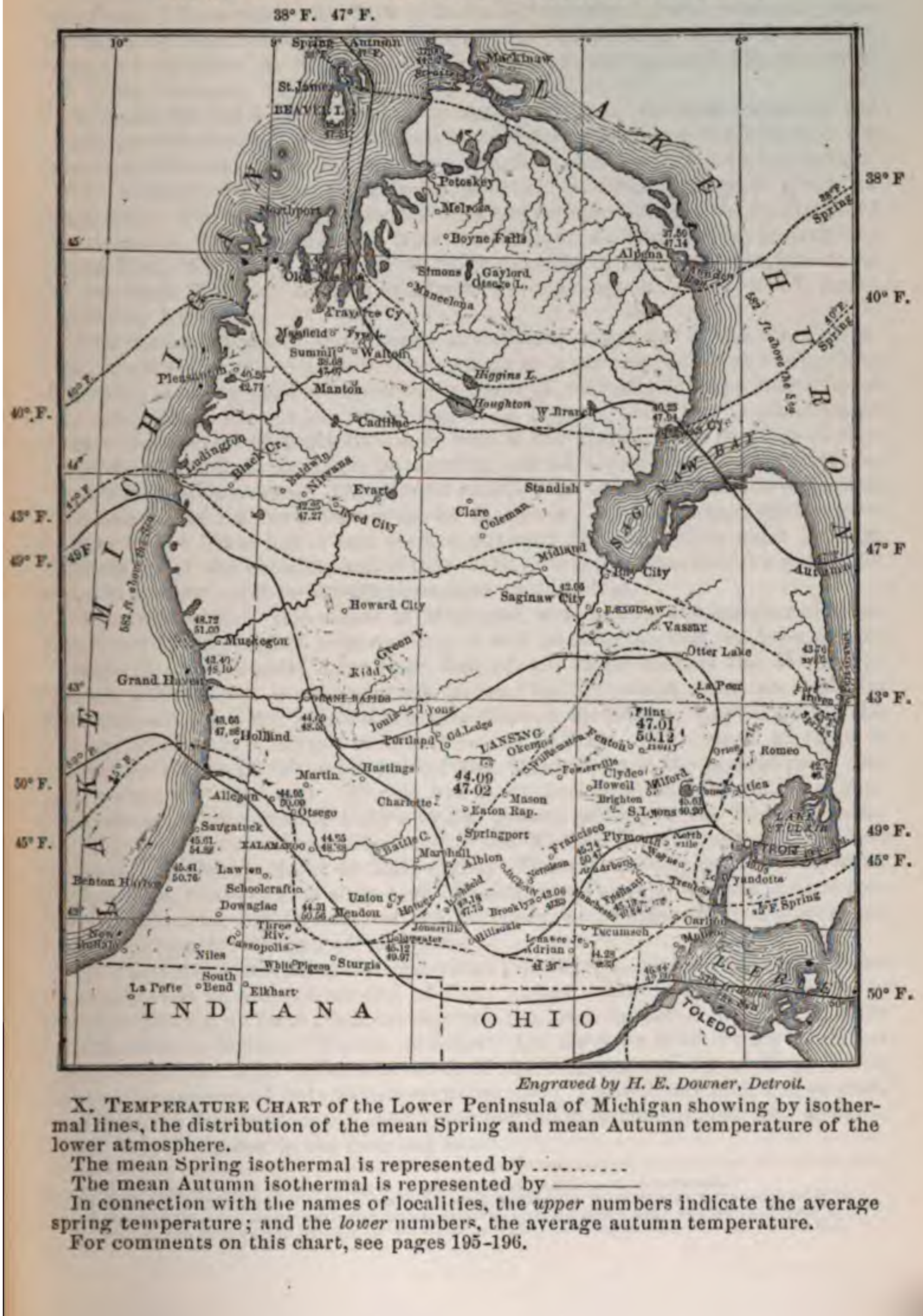
The mean winter temperature of 24°, that of Port Huron, Lansing, Coldwater, and Manistee, equals that of Central Indiana, Western New York, Central Illinois, Central Montana and Yellowstone region, Denver, and Eastern Colorado.

The mean winter temperature of 20° F., that of Mackinaw, equals that of Northern New York, Central Wisconsin, and Southeastern Minnesota.

The mean summer temperature of 68° F., that of Detroit, Flint, Lansing, and Grand Haven, is the same as that of St. Paul, Minn., upper Green Bay (lat. 45°), Denver (lat. 40°), New York City (lat. 41°), Boston, New Haven, Central Ohio, Fredericktown, Md. (lat. 39° 50′), Altoona, Penn., Newark, N. J., Ft. Buford, Dakota Ter. (1900 feet elevation lat. 48°), Dahlonega, Ga. (lat. 34° 50′), Ft. Stanton, New Mex. (5000 feet elevation, lat. 33° 50′), Central Nevada (lat. 38° 41′), Western Washington Ter. (lat. 47°), Los Angeles, Cal. (lat. 34°), Santa Barbara, Cal. (lat. 34°), and San Diego, Cal. (lat. 32° 50′).

The mean summer temperature, 64°, north of Grand Haven, Lansing, and Detroit, and south of Au Sauble and Grand Traverse, equals that of Chicago, Central Wisconsin, Western Minnesota, Eastern Dakota, Central New York, and Northern Pennsylvania and Massachusetts.

CHART X.—Mean Spring and Mean Autumn Temperature.



Engraved by H. E. Downer, Detroit.

X. **Temperature Chart** of the Lower Peninsula of Michigan showing by isothermal lines, the distribution of the mean Spring and mean Autumn temperature of the lower atmosphere.

The mean Spring isothermal is represented by ....

The mean Autumn isothermal is represented by ————

In connection with the names of localities, the *upper* numbers indicate the average spring temperature; and the *lower* numbers, the average autumn temperature.

For comments on this chart, see pages 195-196.

In determining this parallelism of temperatures of different places outside the State, I have made use of the isothermal,* isochimal,† and isotheral‡ lines of the most recent reports of the Smithsonian Institution, published in 1876, compiled by Chas. A. Schott, Asst. U. S. Coast Survey, and also the work of Loren Blodgett, "Climatology of U. S.," 1857.

A RAIN CHART (XI.) showing, by isohyetal§ lines, the distribution of the mean precipitation of rain and melted snow for winter and summer and for the year, obtained from the published charts of the Smithsonian Institution, 1872, arranged by Chas. A. Schott, Asst. U. S. Coast Survey, is given on page 201. The figures opposite the cities and villages indicate the total annual precipitation, and were obtained from the tables of the Smithsonian Institution, from Prof. Winchell's tables, from those reported by the meteorological corps of the State Board of Health, and from "Climatology of U. S.," 1857, Loren Blodgett, LL.D.

The determination of the amount of moisture suspended in the air, that is, the humidity, is of the greatest importance in a sanitary point of view. The humidity is not dependent upon the amount of rainfall; and the humidity of the atmosphere may be less where there is a large rainfall than in other places where the amount of precipitation in rain is but slight. The presence of saturated soil and drowned lands or marshes, and of continuous forests, gives rise to a humid atmosphere. The general relief of the land from surplus water and the removal of the dense forests render the climate dry. The atmospheric condition of the State has in this respect changed very materially since the first settlement of the country, and it is to work in this direction that we must look to still further improve the sulubriousness of this State.

In studying this rain chart of Michigan, and noting the number of clear days and the absence of mist and fog, it will be observed that we have a comparatively dry climate, drier than that of any State east of the Mississippi River, a fact which is not generally credited by the people, on account of the presence of the Great Lakes upon three sides of the State. The rainfall in the Lower Peninsula is thirty-two inches on an average. The mean of Ohio is thirty-six inches in the upper half of the State, forty at the central part, and forty-four at Cincinnati. Illinois has forty inches annual rainfall as a general mean; Pennsylvania, forty over the greater portion of the State; District of Columbia, forty inches; Connecticut and Western Massachusetts, forty-four inches; Kentucky, forty to forty-eight; Tennessee, forty-four to fifty-two; Mississippi, forty-eight to sixty-four; Washington Territory, sixteen to eighty,—eighty upon the Pacific coast of the Territory, and sixteen at the one hundred and eighteenth meridian of longitude.

A small space, including the western half of Berrien, Van Buren, and Allegan counties, has an average rainfall of forty inches. The isohyetal line of forty inches, coming up from Ohio, reaches into the lower border of Lenawee and the south-western corner of Monroe counties. On the other hand, by far the larger portion of the Lower Peninsula north of the Saginaw and Grand River Valley shows an average of only twenty-eight inches. There is but little fog or mist, except over the marshes and undrained low lands in the summer and autumn, and these disappear in the morning sun.

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* Isothermal lines are lines passing through places of equal mean temperature.
† Isochimal lines are lines passing through places having the same winter mean temperature.
‡ Isotheral lines are lines passing through places having the same mean summer temperature.
§ Isohyetal lines are lines passing through places which have the same mean annual rainfall.

A winter average of six inches of precipitation is shown by a dotted line coming up from Toledo, Ohio, and extending to Port Huron in an arc corresponding to the elevated land of Ypsilanti and Pontiac. This line returns to Ohio, in a similar arc, about thirty miles west of its point of entrance. (Page 201.)

A winter isohyetal line of six inches precipitation enters the southern boundary of the State west of Coldwater, and going in a northerly and north-westerly direction enters Lake Michigan at latitude 44°, near Ludington. (Page 201.)

A winter isohyetal of eight inches enters a little further west of Coldwater, and extending north to Grand Haven bends westerly and southerly and re-enters Indiana twenty miles east of New Buffalo.

A winter isohyetal of four inches, beginning at latitude 44° on Lake Huron, crosses Saginaw Bay, sweeps out around Thunder Bay Island and Mackinaw, and tends down to the south-west, west of the Beaver Islands. (Page 201.)

A summer isohyetal of eight inches enters above Fort Gratiot, passes south-westerly on the high ground to Plymouth and Howell, then bends to the north and crosses Saginaw Bay and extends up the coast above Thunder Bay. (Page 201.)

A summer isohyetal of ten inches enters below Port Huron and passes Detroit, Ypsilanti, Jackson, Homer, Battle Creek, Hastings, and north of Lansing, passes north to Mackinaw, re-enters the Lower Peninsula at the Beaver Islands and west of Grand Traverse Bay, and passes south to Holland, where it enters Lake Michigan. (Chart XI., page 201.)

A summer isohyetal of twelve inches enters from Ohio, south of Adrian, passes Tecumseh, Brooklyn, Hillsdale, and south of Coldwater, through Mendon, and up to Grand Rapids, and bends abruptly south to Dowagiac and New Buffalo. (Chart XI., page 201.)

An annual precipitation of twenty-eight inches begins at Fort Gratiot and going westward and northward through the Saginaw Valley, sweeps north-easterly above Saginaw Bay, and northward up Lake Huron. (Chart XI., page 201.)

An annual rainfall of thirty-two inches is shown about Thunder Bay. (Chart XI., page 201.)

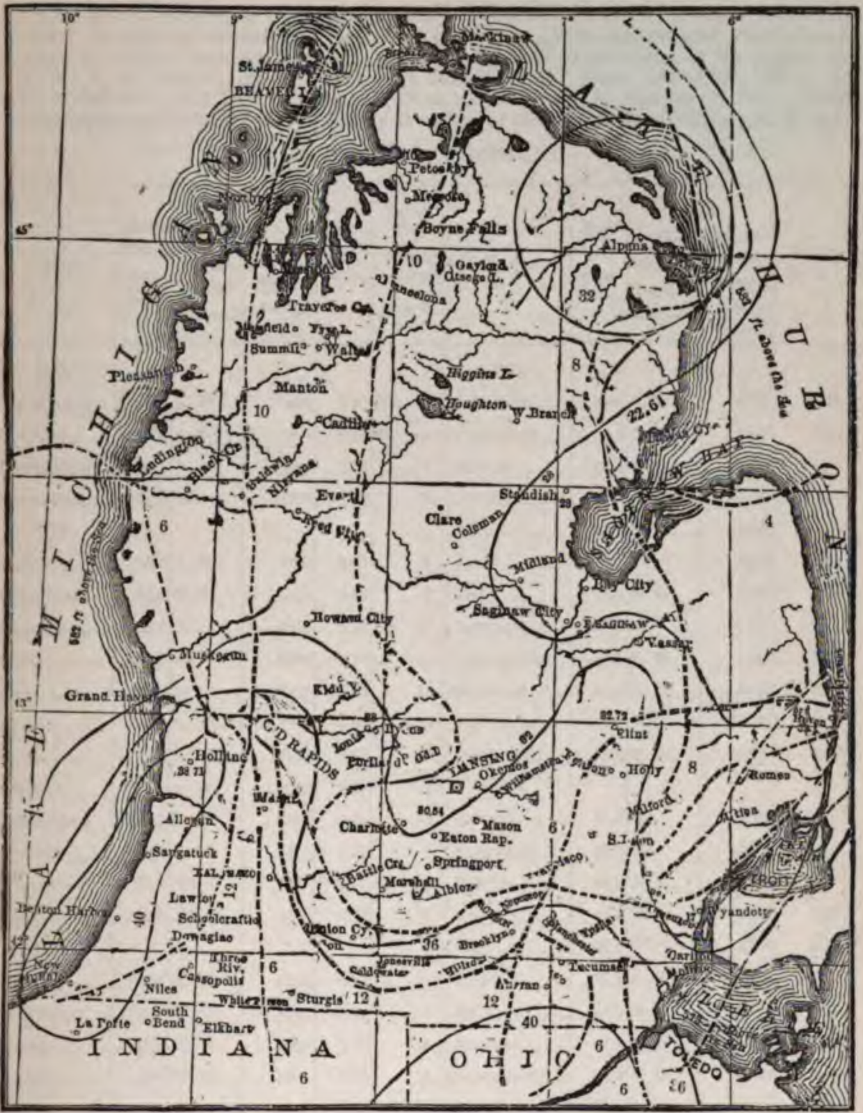
The isohyetal line of thirty-two inches crosses the mouth of the Detroit River, sweeps north of Ypsilanti to Flint and then south-westerly to Charlotte, and with a north-western arc passes into Lake Michigan north of Grand Haven. (Chart XI., page 201.)

An isohyetal of thirty-six inches precipitation enters the State south of Monroe, passes up to Ann Arbor and south-westerly to the vicinity of Coldwater, and north-westerly to Grand Rapids and Grand Haven. (Chart XI., page 201.)

A STORM CHART, designed to show the frequency with which the centers of areas of low barometer, assumed to average fifty miles in diameter, passed over given districts in the two years ending with February, 1873, is given in connection with the Woodland Map on page 190.

The accompanying tables of temperatures (pages 203–207), prevailing direction and force of wind, and the amount of precipitation and number of days upon which rain or snow fell, at Detroit, Grand Haven, Alpena, and Port Huron, from Sept., 1871, to Sept., 1878, have been forwarded to the committee by Gen'l Meyer, Chief Signal Officer, U. S. A.

CHART XI.—Isohyetal Lines,—Winter, Summer, and Annual Rainfall.



Engraved by H. E. Downer, Detroit.

XI. **Rain Chart** of the Lower Peninsula of Michigan, showing, by isohyetal lines, the distribution of the mean precipitation of rain and melted snow for Winter, Summer, and for the year. The annual mean precipitation for a number of cities is also shown in figures.

The mean Winter isohyetal is represented by - - - - - - - - - - - -
The mean Summer isohyetal is represented by . . . .
The mean Annual isohyetal is represented by ————————
For a description of the lines on this chart, see pages 199, 200.

STATEMENT—Showing the Mean Monthly Temperature, the Prevailing Direction, and Total Monthly Movement of Wind, the Amount of Precipitation and Total Number of Days on which Rain or Snow fell, at the Stations of Observation of the Signal Service, U. S. A., at Detroit, Mich., and Grand Haven, Mich., from September, 1871, Alpena, from October, 1872, and Port Huron, from August, 1874, to September, 1878,—inclusive. (Compiled from the records on file in the office of the Chief Signal Officer, U. S. A.)

DETROIT, MICHIGAN.

DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.	DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.
		Prevailing Direction.	Total Movement, Miles.					Prevailing Direction.	Total Movement, Miles.		
1871.						1874.					
September..	58.5	S. W.	5695	1.43	No record.	January.....	28.9	S. W.	6812	5.16	23
October.....	55.0	S. W.	No record.	0.69	No record.	February...	27.5	E.	5133	2.00	16
November ..	33.0	N. W.	4810	2.76	7	March	34.4	N. W.	7980	1.55	13
December...	23.0	W.	4780	1.88	15	April	37.3	N. E.	6257	1.39	11
1872.						May	59.0	S. W.	5616	1.93	12
January.....	23.0	S. W.	5920	1.05	7	June	68.9	E.	4847	4.53	10
February...	23.0	N. E.	3920	0.69	7	July	71.4	S. W.	4954	3.65	11
March.......	25.6	W.	6210	1.22	10	August......	67.9	E.	4176	2.11	7
April	46.8	E.	6608	2.15	11	September..	66.7	S. W.	4101	0.67	9
May	56.8	W.	5827	5.64	13	October.....	51.3	S. W.	5014	0.78	9
June	68.3	S. W.	4294	2.85	6	November ..	38.4	W.	6233	2.26	15
July	72.8	S. W.	4069	2.63	10	December...	29.7	S. W.	6282	0.60	12
August......	71.6	S. W.	5306	2.60	12	1875.					
September..	62.6	S. W.	5461	3.84	12	January.....	15.3	W.	5349	0.97	18
October.....	49.1	S. W.	5414	1.60	8	February ...	12.3	W.	6332	1.82	13
November...	32.9	W.	6237	0.67	11	March	28.3	N. E.	6768	3.00	18
December...	20.0	W.	6545	0.69	11	April	40.9	W.	5876	0.70	11
1873.						May	57.5	W.	5873	5.83	13
January.....	20.6	S. W.	6754	3.20	12	June	67.2	S. W.	4835	3.25	11
February ...	22.9	N. W.	5775	0,32	8	July	70.2	S. W.	4197	3.73	8
March.......	30.9	N. W.	6993	1.79	15	August......	67.1	S. W.	4572	6.04	19
April	42.0	N. W.	5331	4.74	18	September..	60.3	S. W.	4786	2.10	9
May	56.9	E.	6047	3.50	11	October.....	46.7	W.	6036	3.35	16
June	69.3	E.	4297	5.18	11	November...	34.6	N.	5614	1.72	12
July	70.5	W.	4814	3.38	11	December...	33.4	S. W.	5937	3.20	19
August......	70.1	N. E.	4707	0.19	5	1876.					
September..	60.9	S. W.	4996	3.28	12	January.....	32.4	W.	7150	2.00	19
October.....	47.9	W.	6276	2.60	15	February ...	28.6	W.	5986	5.59	17
November ..	32.2	W.	5430	1.03	16	March	29.8	N. W.	6646	5.50	20
December...	32.7	W.	6449	4.69	17	April	44.0	W.	5690	1.80	13

METEOROLOGICAL STATEMENT—*Continued.*

DETROIT, MICHIGAN.—*Continued.*

DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.	DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.
		Prevailing Direction.	Total Movement, Miles.					Prevailing Direction.	Total Movement, Miles.		
1876.						1877.					
May	57.5	E.	4896	5.62	20	August	71.6	S. W.	3774	7.29	16
June	69.3	S. W.	4643	1.51	17	September	64.6	S. W.	3969	0.39	8
July	73.0	S. W.	4293	5.94	12	October	53.8	S. W.	5537	4.72	16
August	72.1	S. W.	3346	2.46	15	November	39.2	W.	5374	4.10	22
September	59.1	E.	4487	2.81	20	December	38.3	S. W.	4905	1.49	17
October	46.2	S. W.	5583	2.89	20	1878.					
November	38.6	W.	4233	2.32	21	January	28.0	E.	4880	3.04	18
December	18.5	S. W.	5821	1.96	21	February	29.9	S. W. & N. E.	4708	2.58	13
1877.						March	40.9	S. W.	5520	3.34	21
January	20.3	S. W.	4357	1.23	16	April	53.3	N. E.	5304	2.06	17
February	33.2	S. W.	4619	0.04	3	May	56.0	W.	5187	2.77	15
March	26.7	N. W.	5867	5.43	23	June	64.9	S. W.	3908	3.36	11
April	46.0	N. E.	4963	3.27	11	July	73.9	S. W. & N. E.	3139	8.76	14
May	57.7	S. W.	4256	0.90	8	August	71.6	S. W.	2754	2.92	12
June	67.2	S. W.	4452	4.80	17	September	64.4	S. W.	3687	3.74	12
July	72.5	S. W.	4203	1.57	11						

GRAND HAVEN, MICHIGAN.

DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.	DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.
		Prevailing Direction.	Total Movement, Miles.					Prevailing Direction.	Total Movement, Miles.		
1871.						1873.					
September	56.8	S. W.	5232	1.23	No rec'd.	January	19.2	S.	7291	No record.	24
October	52.4	S. W.	No record.	1.75	10	February	22.6	W.	7279	.91	11
November	33.2	E.	5982	2.33	14	March	30.2	N. W.	No record.	1.62	14
December	22.7	W.	No record.	1.38	20	April	41.9	S. W.	No record.	2.24	13
1872.						May	54.9	S. W.	No record.	5.42	11
January	24.4	W.	No record.	1.54	17	June	69.1	S. W.	5838	4.15	9
February	21.5	W.	No record.	0.64	7	July	68.2	S. W.	No record.	3.25	12
March	24.3	W.	7457	1.64	15	August	69.1	S. W.	5729	1.95	7
April	43.5	S. W.	No record.	2.31	12	September	57.8	S. W.	7535	2.30	10
May	52.9	W.	6767	2.94	15	October	46.9	W.	8794	2.50	13
June	64.6	W.	5334	2.27	6	November	33.3	N. W.	No record.	No record.	18
July	69.5	S.	4905	1.46	11	December	34	S. W.	10125	No record.	16
August	69.5	S. W.	5112	6.31	13	1874.					
September	60.8	W.	7939	9.37	16	January	28.4	S.	8619	No record.	20
October	48.3	S. W.	7333	.84	5	February	27.6	S. W.	7414	No record.	13
November	33.4	N. W.	No record.	2.02	20	March	32.2	N. W.	11312	No record.	11
December	20.5	W.	No record.	No record.	18	April	36.3	S. W.	8600	No record.	8

METEOROLOGICAL STATEMENT—*Continued.*

GRAND HAVEN, MICHIGAN—*Continued.*

DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.	DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.
		Prevailing Direction.	Total Movement, Miles.					Prevailing Direction.	Total Movement, Miles.		
1874.						1876.					
May	56.6	S. W.	8238	2.23	10	August.......	70.5	W.	5697	1.82	9
June	65.9	S. W.	6459	5.70	9	September..	58.6	E.	6563	6.24	15
July	70.4	S.	7617	4.19	4	October......	47.1	W.	10978	2.28	17
August.......	68.4	N. E.	5853	1.19	5	November ..	39.0	S. E.	7531	5.26	17
September..	63.9	S. W.	6762	5.05	14	December...	21.9	W.	10467	1.16	22
October......	51.6	S.	7950	1.48	10	1877.					
November ..	39.3	N. W.	9472	2.43	19	January......	24.2	S. W.	10096	1.53	23
December...	30.7	S. W.	9286	.88	14	February.....	32.6	S.	7518	0.09	3
1875.						March	28.0	N. W.	9687	3.15	23
January......	18.6	N. W.	8923	No record.	26	April..........	45.4	E.	8242	4.48	10
February.....	12.9	W.	8717	No record.	18	May	57.0	S.	7316	2.10	7
March........	28.5	E.	8360	0.31	18	June	63.4	S.	6754	4.18	15
April..........	39.8	W.	8221	2.33	13	July..........	70.1	S. W.	6764	1.42	11
May...........	53.6	W.	8257	4.14	13	August.......	68.7	S. W.	6328	1.52	10
June.........	61.7	W.	6184	1.74	11	September..	63.8	S. W.	6223	0.67	9
July..........	67.3	W.	5594	2.53	11	October......	52.9	N. W.	9096	6.45	16
August.......	64.6	S. W.	6875	2.39	8	November ..	39.4	W.	8197	6.47	18
September..	58.6	S. W.	7862	3.29	10	December...	42.0	N. E.	8448	3.97	11
October	47.1	S.	11336	6.17	16	1878.					
November ..	35.0	E.	8878	1.44	14	January......	31.9	S. E.	7542	1.34	13
December...	34.4	E.	10470	2.79	16	February.....	34.0	E.	6434	1.42	7
1876.						March	42.9	S. E.	8287	4.51	15
January......	31.9	N. W.	11762	3.67	18	April..........	52.0	N. E. & S. E.	7617	2.10	13
February.....	29.6	E.	10359	2.41	20	May	53.1	N. W.	7534	2.57	10
March	30.6	N. W.	10817	1.99	17	June.........	62.7	N.	6367	1.85	9
April..........	44.7	W.	9431	3.18	9	July..........	73.0	N. W.	5424	2.27	6
May..........	55.2	S. W.	8095	5.42	14	August.......	70.4	S. W.	5593	3.35	8
June	65.7	W.	7878	9.35	15	September..	62.9	S.	7350	3.04	6
July..........	71.1	S. W.	6732	3.51	11						

ALPENA, MICHIGAN.

1872.						1873.					
October......	45.0	N. W.	4702	2.40	14	January......	15.6	S.	5995	1.43	8
November ..	31.4	S. W.	4865	1.59	14	February.....	17.8	W.	7375	.43	7
December...	17.1	S. W.	5985	1.76	16	March	25.7	W.	8275	1.53	14

METEOROLOGICAL STATEMENT—*Continued.*

ALPENA, MICHIGAN.—*Continued.*

DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.	DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.
		Prevailing Direction.	Total Movement, Miles.					Prevailing Direction.	Total Movement, Miles.		
1873.						1876.					
April	36.3	E.	5961	3.12	14	January	24.5	N. W.	7901	3.53	22
May	46.9	S. E.	5559	2.91	8	February	19.5	N. W.	8541	2.61	16
June	60.2	S. E.	5160	3.03	11	March	22.7	N. W.	8378	2.98	18
July	63.9	W.	5415	3.21	13	April	35.6	N. W.	7044	1.62	16
August	63.9	S. E.	5041	1.96	10	May	47.5	S. E.	5711	6.56	17
September	53.7	W.	6593	5.14	19	June	60.8	S. E.	4788	3.47	18
October	41.8	S. W.	7324	4.71	19	July	67.3	N. W.	5039	4.02	12
November	26.2	W.	6361	2.74	21	August	67.1	S. E.	4582	4.67	9
December	28.0	W.	7234	.89	15	September	55.1	N. W.	5836	0.36	7
1874.						October	40.5	W.	7449	2.61	19
January	21.6	W.	7196	2.34	16	November	34 8	N. W.	5397	3.03	22
February	20.0	W.	5703	.85	17	December	15.5	N. W.	7631	2.16	27
March	24.6	N. W.	9221	1.83	12	1877.					
April	29.9	N. W.	7354	.75	11	January	15.8	N. W.	6220	1.41	22
May	49.8	N. W.	6223	4.16	12	February	28.2	N. W.	5486	0.48	6
June	60.2	S. E.	6199	2.05	11	March	20.1	N. W.	6768	1.97	16
July	65.1	S. E.	5978	2.06	10	April	38.6	S. E.	6061	1.21	7
August	63.3	S. E.	4472	1.77	8	May	51.0	S. E.	5196	0.64	7
September	60.0	S. E.	5380	3.86	16	June	60.5	S. E.	5838	3.25	15
October	45.6	N. W.	5297	3.27	14	July	66.9	S. E.	5133	3.56	12
November	33.4	W.	7453	1.63	14	August	66.4	N. W.	4762	7.99	14
December	23.3	N. W.	7223	.61	16	September	59.6	N. W.	4148	1.75	14
1875.						October	46.3	N. E.	6299	13.18	22
January	10.0	W.	6007	0.92	18	November	35.5	S. W.	5964	3.81	20
February	4.1	W.	6397	1.12	17	December	33.7	S. W.	5297	1.75	17
March	19.6	S. E.	6379	1.60	18	1878.					
April	32.2	N. W.	5903	0.74	16	January	23.6	N. W.	5647	0.82	17
May	47.8	S. E.	5559	3.22	9	February	27.9	N. W.	5112	2.94	10
June	58.7	S. E.	4864	1.76	5	March	35.0	N. W.	6468	1.20	17
July	64.9	N. W.	5255	2.38	6	April	45.7	N. W.	5797	2.74	11
August	62.5	S. E.	5047	5.34	14	May	49.3	N. W.	6400	3.34	16
September	54.3	N. W.	6652	8.43	14	June	29 d'ys only. 58.5	S. E.	5813	4.74	10
October	40.8	N. W.	7494	6.55	22	July	69.7	N. W.	4340	5.56	12
November	29.4	N. W.	6454	2.34	19	August	67.9	N. W.	3839	0.65	13
December	26.9	N. W.	7088	2.87	22	September	59.6	N. W.	6069	9.06	13

METEOROLOGICAL STATEMENT—*Continued.*

PORT HURON, MICHIGAN.

DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.	DATE.	Mean Temperature.	WIND.		Total Rain.	No. of Days on which Rain or Snow fell.
		Prevailing Direction.	Total Movement, Miles.					Prevailing Direction.	Total Movement, Miles.		
1874.						1876.					
August......	67.1	N. E.	5527	0.23	5	September..	57.4	N. E.	6287	2.88	15
September..	65.0	S.	5884	1.89	10	October.....	44.4	S. & W.	7776	2.72	14
October.....	49.6	N. W.	6674	1.21	12	November ..	37.7	W.	5688	1.66	21
November ..	36.8	W.	8166	2.31	13	December...	17.9	N. W.	8070	3.24	27
December...	27.4	S.	8513	0.72	10	1877.					
1875.						January.....	19.4	S.	6032	2.33	18
January	13.6	W.	6682	1.08	17	February....	30.6	S.	6116	*......	10
February....	9.8	S. W.	8205	1.43	17	March	24.7	S.	8695	6.25	21
March.......	26.5	N. E.	8466	4.03	18	April........	39.9	N. E.	7063	2.20	11
April........	37.3	W.	8012	1.13	13	May	52.2	N. E.	6652	1.34	7
May.........	53.2	N. E.	7127	3.93	14	June	63.2	S.	6236	4.59	16
June	62.8	N. E.	6159	1.68	12	July.........	70.0	S.	5812	1.59	13
July.........	67.2	N. E.	5495	2.14	10	August......	69.8	N. E.	4569	4.03	17
August......	66.0	S.	5922	2.79	13	September..	63.2	S.	4781	0.28	8
September..	58.2	S.	6739	2.38	12	October.....	52.1	S. W.	6028	3.96	13
October.....	45.2	S.	8487	4.41	17	November ..	38.3	S. W.	7319	3.93	20
November ..	32.5	N. W.	7183	1.10	12	December...	37.2	S. W.	7322	1.11	15
December...	31.1	N. W.	7443	3.04	21	1878.					
1876.						January.....	26.5	S.	6434	1.41	16
January.....	30.3	W.	9614	1.78	22	February....	28.7	S.	6664	1.53	15
February....	26.1	S.	8077	3.93	15	March.......	39.7	N.	7461	5.17	18
March.......	27.7	S.	8753	5.25	19	April........	49.9	N.	7236	2.88	15
April........	40.2	N. & W.	7884	2.17	16	May.........	53.5	N. E.	7122	2.41	14
May	53.1	S.	7161	4.07	19	June	63.1	N. E.	5503	2.90	12
June	66.0	S.	6397	3.42	22	July.........	71.2	N. E.	5283	4.74	15
July.........	69.4	S.	6017	3.04	15	August......	70.9	S. W.	5422	4.53	13
August......	70.2	S.	4547	3.00	10	September..	63.3	S.	6610	5.48	15

* Amount of precipitation collected in the gauge during the month, too small to measure.

The effect of climate upon the human body, according to our best sanitary authority, is the sum of the influences which are connected either with the solar agencies, the soil, the air, or the water of a place; and as these influences are in the highest degree complex, it is not at present possible to trace out their effects with any certainty.

The employment of climate in the prevention of disease dates back to the Romans. The remains of Cicero's summer villa is still shown near Pozzuoli, and Horace wrote of the cool air of lovely Baiæ. The benefits of long sea voyages were known in the earliest days of the traders upon the Mediterranean. In the summer many of the better class of Romans sought refuge away from the malarial climate of the Eternal City, upon the hills of Stabiæ, and upon the sea coast.

There are many factors in climate and in its effects upon the different races that have not been determined, but are still under observation. The effect of altitude is one; the influence of ozone is another. Pasteur and Tyndall have proved that the organic substances are much more numerous near the earth's surface than in the high mountain regions. Ozone destroys the products of decomposition, by chemically combining with them at ordinary temperatures. The presence of ozone proves the absence of organic impurities. The pine woods of the upper half of the State should offer a pure air on account of the balsamic emanations of the trees converting the oxygen of the air into ozone.

With regard to Pulmonary Consumption in Michigan, we find that there is about the same per cent, as exists in Central Ohio, Southern New York, Southern Vermont, Western Massachusetts and Connecticut, Maryland, Eastern Virginia, and Northern Indiana,—fourteen to twenty per cent of all deaths, according to the U. S. census for 1870. This is in accordance with the U. S. Census for 1870, and has been deduced from a comparison of the proportion of deaths from consumption to all deaths occurring during a certain number of years. It has been shown by competent authority that this method of comparison does not determine the relative amount of consumption in different States. For such a comparison, there should be given the per cent of deaths to the population, and also the sex and age of decedents and of inhabitants. Nevertheless, these statements of per cent of deaths from consumption to all deaths may be valuable for certain purposes.

Dr. E. Andrews, of Chicago, gives the per cent of deaths from consumption to all deaths for different States in the same parallel of latitude, showing, in this case, an apparent decrease according to the distance from the sea and increase of elevation, as follows:

In Massachusetts, 25 per cent;
In New York, 20 per cent;
In Ohio, 16 per cent;
In Indiana, 14 per cent;
In Missouri, 10 per cent;
In Kentucky, 9 per cent;
In Colorado, 8 per cent;
In Utah, 6 per cent;
In California, 14 per cent.

According to the Registration Reports of Michigan, the per cent of deaths from consumption to all deaths for 1871 was 13.39;[*] that for 1872 was 10.97;[†] for 1873, 10.15.[‡]

Dr. Bowditch, of Boston, Mass., first studied the relations between dampness of the soil and consumption as one of cause and effect. Dr. Buchanan, of London, reported independently the same conclusions. These views prevail at the present time, and favor the subsoil drainage of saturated lands, lowering the ground water. The theory that the acquisition of a malarious cachexy[‖] will prevent the development of consumption is hardly tenable with our present knowledge on this subject. It will probably be found that the larger proportion of cases of consumption, when no new factor, such as unhealthy occupation or unventilated residences and crowding, is introduced, come from wet lands, or from the vicinity of wet lands. We can foretell with great certainty the diminution of consumption in Michigan, in proportion to the number of inhabitants, with the elimination of the excess of soil water, unless the modes of life and occupation are sufficient to counter-influence the increased salubriousness of the climate. It has been definitely proved that temperature has nothing in common with consumption; but it is only within a few years that the relationship of excess of humidity and consumption has been understood.

Malarial fevers are not so common in this State as formerly. Wherever drainage has been made, the cases have diminished, at the least estimation, seventy-five per cent. The mortality from malarious forms of disease, according to the U. S. census of 1870, equals that of Northern Ohio, Western Pennsylvania, and Central Illinois. In the south-western corner of the State, where there are 40 inches of annual precipitation, and in the Saginâw and Grand River Valley, there is a larger proportion of cases of fevers of a malarial type.

The effect of the county drainage law is to constantly improve the health of the people in this respect; and with a better knowledge of the effects of drainage upon the health, this fact will be more readily appreciated.

The latitude 45°, which has been taken as the limit of intermittent fever upon this continent, passes through this State just above Thunder Bay; and although malarious fevers are in some places, notably near the sources of the Mississippi River, found at the 47th parallel, yet the conjunction for a sufficient time and intensity of these important factors, heat and moisture, rarely occurs north of latitude 45°. Upon the eastern side of Lake Huron, the line of intermittent fevers does not extend north of latitude 43° 30′. It will be seen from the near proximity to the line of entire exemption, that this State is favorably situated as regards malaria; and that, with the extension of the drainage of the wet lands and the opening up of the country, the sanitary influences of the climate as regards malarious forms of disease will constantly improve.

The per cent of sickness and mortality from dysentery has diminished in equal ratio with that of malarial fever, and in direct proportion to the relief of the country from stagnant water and saturated soil. In this connection, to avoid repetition in this report of much that has been hitherto published by this Board, the committee would refer to papers upon "Draining for Health," pages 41–53 of the Second Annual Report of the Secretary of the State Board of Health, 1874; on "Meteorology of Central Michigan," pages 195–213 of the same Report; on "The Influence of Drainage in Removing Certain Diseases, and in promoting the Healthfulness of Cities," pages 147–160 of the Report of the Secretary of the State Board of Health for 1875; on "Healthful Dwellings," pages 47–67 of the Report of the Secretary of the State Board of Health for 1877; and on "Healthy Homes for Farmers," pages 328–341 of the Report of the Secretary of the State Board of Agriculture for 1877, reprinted by State Board of Health, 1878.

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[*] Vital Statistics of Michigan, 1871, page 304.

[†] Vital Statistics of Michigan, 1872, page 352.

[‡] Vital Statistics of Michigan, 1873, page 250.

[‖] Cachexy, a depraved condition of the system.

Diseases of the intestinal canal are very much influenced by climate. The average of deaths from these diseases in Michigan is about the same as that of Northern Ohio and Indiana. Enteric fever, cerebro-spinal meningitis, and typhus fever are about as frequently fatal in Michigan as in Western New York and Central Ohio, judging by the U. S. Census returns for 1870.

The limits of this paper preclude its extension in this direction. It is to be hoped that the large amount of information derived from the observation of the meteorology of this and neighboring states may be constantly made of service to the people in establishing upon a scientific basis the medical geography and climatology of this northern central region of the United States.

THE
PRINCIPAL METEOROLOGICAL CONDITIONS
IN MICHIGAN
DURING THE YEAR 1877:

A Compilation Based, in Great Part, upon Reports by the

METEOROLOGICAL OBSERVERS

FOR THE

STATE BOARD OF HEALTH;

COMPILED AND PREPARED IN THE OFFICE OF THE SECRETARY OF THE BOARD,
LANSING, MICHIGAN.

THE PRINCIPAL METEOROLOGICAL CONDITIONS IN MICHIGAN DURING THE YEAR 1877.

Meteorological Stations having been established in different parts of the State, at which regular observations are made, recorded, and reported by Observers for the State Board of Health, there is presented herewith some results of these observations during the calendar year 1877, and also, as regards the central part of the State, a few comparisons with meteorological data for previous years. The records of these observations are important contributions to a study of the meteorology of the country, but their principal use in the work of this Board is for study in connection with reports of diseases and deaths in different parts of the State. Because of this, the compiler ventures to offer the following suggestions which it is hoped may explain some of the uses made, and aid in the further use of the data supplied in this article, in connection with other articles in this Report, such as the one on Diseases in Michigan in 1877, on pages 105–165, and the one on Weekly Reports of Diseases in 1877, on pages following this article.

SUGGESTIONS AS TO USE OF METEOROLOGICAL DATA.

Meteorological conditions are known to have great influence on the health of the people; and certain groups of such conditions are known to be coincident with, and are believed to cause, directly or indirectly, a very great many deaths during each year; such, for instance, as a large proportion of the deaths from diseases of the bowels, in Summer, and of deaths from croup, bronchitis, inflammation of the lungs, etc., in Winter. Any study of the causes of diseases, with a view to their prevention, and especially the study of such diseases as are referred to above, must, therefore, include comparisons of their rates with statements of the meteorological conditions existing at the same time or immediately preceding. Such comparisons can be made by years, by seasons, and by months, and will be facilitated by noting those years, seasons, or months which are exceptional in any of the meteorological conditions observed, and ascertaining whether there were any exceptional facts concerning any disease which appear to correspond therewith; and, if so, whether comparisons for series of years, seasons, or months show such correspondence to be constant. Conversely, exceptional times of disease supply peculiarly favorable opportunities for studying meteorological conditions which may influence the disease.

In considering the question to what extent meteorological conditions are causative of any given disease, and to what extent they are only incidental, all other conditions which can have influence in causing or modifying the disease must be kept in mind or be separately considered. In order to eliminate the evidences of unknown or unconsidered influences, and of those which are only indirect or incidental, comparisons must be made by different periods of time; as, for instance, if a given disease is found to prevail most in *years* when certain meteorological conditions prevail, it is needful to learn whether it also prevails most in *months* when the same meteorological conditions prevail; because the disease might be caused by something coincident with such conditions, and which only occurs once in a year, and can therefore be coincident only by years. Conversely, it is useful to compare by *years*, when a disease has been found coincident with certain meteorological conditions by *months*.

Because of the interdependence of the several meteorological conditions, it is usually the fact that when certain meteorological conditions are found to bear a more or less constant relation to a given disease, certain other meteorological conditions are found also to have nearly or quite as constant a relation, so that the cause of the disease is not certainly reached by means of this knowledge alone; but the search is greatly aided by a technical knowledge of diseases as relates to their pathology; and a good knowledge of physiology is almost essential to a correct appreciation of the bearing of the evidence as to the causation of a disease. There is much, however, that may be done in advancing this study by the meteorologist or physicist alone; because it not infrequently happens that the usual harmony in the meteorological conditions is not maintained, some one or more being exceptionally prominent or absent, as the case may be. Such circumstances promise valuable rewards for study and comparison with the diseases at the same time and immediately following.

In certain exhibits in the article on Weekly Reports of Diseases in Michigan in 1877, printed on pages following, comparisons are made of statements, by months, relative to the prevalence in 1877 of croup, intermittent fever, pneumonia, and rheumatism, with statements by months of certain meteorological conditions, for the same period.

SOURCES OF INFORMATION.

The contributors of meteorological data for the tables and diagrams of this article are stated in Exhibit 7, on page 215. The tables have been compiled and the diagrams made in the office of the Secretary of the State Board of Health.

Meteorological registers covering parts of the year 1877 have been received from several other observers. Although furnishing much valuable data, they are not included in this compilation, because, in most instances, they are not sufficiently continuous or not for a period sufficiently long to be accurately comparable with the results of observations which cover the entire year. In one case, observations of the barometer are not included, because the instrumental error appears to be so large that the statements would not be comparable with those for the other places, though useful for comparisons by months in studying any disease for that locality.

METHOD OF RECORDING METEOROLOGICAL CONDITIONS.

In order to give a better idea of the method of recording the meteorological data on which the tables of this compilation are based, a copy (reduced in size) of the blank registers supplied by this Board to its Meteorological Observers is printed on page 216. The columns for "Pressure of Vapor," "Relative Humidity," "Absolute Humidity," and "Barometer Reduced to Freezing Point" are filled by computations, made by means of meteorological tables, from the statements recorded in the other columns. The directions recommended by the Board for taking meteorological observations and for care of instruments, are printed on the back of each blank meteorological register. A copy of these directions having been printed on pages xxxv–xxxviii of the Third Annual Report, they are not repeated here; although extracts are given wherever necessary to an explanation of any part of the subject.

EXHIBIT 7.—*Names of Observers whose Reports are summarized in the Tables and Diagrams of this Article on the Principal Meteorological Conditions in Michigan in 1877, their Places of Observation, and the Counties and Geographical Divisions of the State, in which these Places are Situated.*

NAME OF OBSERVER.	PLACE OF OBSERVATION.	COUNTY.	GEOGRAPHICAL DIVISION OF THE STATE.*
H. T. Calkins, M. D.	Fyfe Lake	Grand Traverse.	North-Western.*
Lee S. Cobb	Nirvana	Lake	Western.
Prof. R. C. Kedzie, M. D.	State Agricultural College, Lansing.	Ingham	Central.
John S. Caulkins, M. D.	Thornville	Lapeer	Bay and Eastern.
John Bell, M. D.	Benton Harbor	Berrien	South-Western.
J. H. Kellogg, M. D.	Battle Creek	Calhoun	Southern-Central.
Lyman P. Alden, Supt. State Public School.	Coldwater	Branch	Southern-Central.
E. H. Van Deusen, M. D.	State Asylum for Insane, Kalamazoo.	Kalamazoo	Southern-Central.
Edwin Stewart, M. D.	Mendon	St. Joseph	Southern-Central.
Dr. E. Hause†	Tecumseh	Lenawee	Southern-Central.
Harrison Peters,‡ M. D.	Tecumseh	Lenawee	Southern-Central.
Prof. L. McLouth	State Normal School, Ypsilanti.	Washtenaw	Southern-Central.
C. Henri Leonard, M. D.	Detroit	Wayne	South-Eastern.
Theo. V. Van Heusen, Sergt. U. S. Signal Service.	Detroit	Wayne	South-Eastern.
F. W. Higgins, Supt. Woodmere Cemetery.	Detroit	Wayne	South-Eastern.

* The counties included in each Division are stated in Exhibit 1, page 113.
† Reports from January to September, inclusive. ‡ Reports from October to December, inclusive.

METHOD OF STATING THE CONDITIONS.

In this article, in stating each of the principal meteorological conditions, the usual method has been adopted, namely, to include statements for the year and for each month of the year in the same table, so that comparisons of the several months with the average for the year may easily be made; and, as regards most of the principal conditions at one central point in the State, statements of the average conditions for the year, and by months during a series of preceding years, are given, in order that comparisons of the year 1877, and of each month in that year, may be made with the averages for corresponding periods in former years.

Comparisons may also be made, by such as have the Second Annual Report of this Board, with statements in an article by Prof. R. C. Kedzie, on the Meteorology of Central Michigan, printed on pages 197–213 of that Report.* The Agricultural College, where the observations by Prof. Kedzie are made, is situated about three and one-half miles east of Lansing, and in about the center of the thickly settled part of the lower peninsula of Michigan. Until such time as we can have continuous observations for a sufficiently long series of years at such a number of stations so distributed in different parts of the State as fairly to represent the meteorology of the whole State, it seems best to use the observations at this central point for the purposes of comparisons of conditions in the given year, with those in previous years.

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* An article on the Meteorological Conditions in Michigan in 1877, may be found on pages 461–464, Report of Michigan State Pomological Society for 1877. An article on Climate and Topography of Michigan is published on pages 167–210 of this Report.

Monthly Register of Meteorological Observations, adopted by the State Board of Health of Michigan.

One copy for each month to be returned, as soon as convenient after the close of the month, to the Secretary of the State Board of Health, at Lansing, Michigan.

For the Month of................, 187..., *at*.................................... } *Lat.*,............; *Long.*,............; *Height of Ground above Sea Level*,...... *ft.*;
Name and Address of the Observer,.. } *Height of surface of Mercury in cistern of Barometer above Sea Level*,...... *ft.*

DAY OF MONTH.	THERMOMETER IN OPEN AIR.				PSYCHROMETER.						PRESSURE OF VAPOR, IN INCHES.			RELATIVE HUMIDITY, OR PER CENT OF SATURATION.			ABSOLUTE HUMIDITY: GRAINS OF VAPOR IN CUBIC FOOT OF AIR.			BAROMETER.					
					7 A. M.		2 P. M.		9 P. M.											7 A. M.		2 P. M.		9 P. M.	
	7 A. M.	2 P. M.	9 P. M.	Daily Mean.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	Dry Bulb.	Wet Bulb.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Baromet'r.	Thermom. Attached.	Baromet'r.	Thermom. Attached.	Baromet'r.	Thermom. Attached.
1																									
2																									
3																									
* * * *																									
31																									
Sums.																									
Means.																									

BAROMETER.				CLOUDS.						WINDS.						OZONE.		REGISTERING THERMOMETER.		RAIN AND SNOW.				DAY OF MONTH.
Reduced to Freezing Point.				7 A. M.		2 P. M.		9 P. M.		7 A. M.		2 P. M.		9 P. M.										
7 A. M.	2 P. M.	9 P. M.	Mean.	Per Ct. of Clouds.	Kind.	Per Ct. of Clouds.	Kind.	Per Ct. of Clouds.	Kind.	Direction.	Force.	Direction.	Force.	Direction.	Force.	Day: 7 A. M. to 2 P. M.	Night: 9 P. M. to 7 A. M.	Maximum.	Minimum.	Beginning Rain or Snow.	Ending Rain or Snow.	Inches of Rain and Melted Snow.	Depth of Snow.	
																								1
																								2
																								3
																								* * * *
																								31
																								Sums.
																								Means.

FOR THIS MONTH, THE TEMPERATURE OF WATER IN WELL: Temperature,..........°; Day of Month on which the Observation is made,.............; Depth of Well,.......... feet.

METEOROLOGICAL CHARACTERISTICS OF THE YEAR 1877.

By way of introduction to the tables and diagrams of the article, Exhibit 8 has been prepared, presenting by means of statements for the year and for each month of the year 1877, some of the general characteristics of the year, as relates to the principal meteorological conditions at one central point, namely, at the Agricultural College, near Lansing. It is given on pages 218–219.

In remarking on the characteristics of the year 1877, as indicated by his observations at the Agricultural College, Prof. Kedzie, in the Report of the State Board of Agriculture for that year, gives the highest temperature as 93°; lowest, 14° below zero; range, 107°; average temperature, 47.42°; average height of barometer, 29.066 inches; and says: "The month of February, 1877, was remarkable for the entire absence of rain and snow. This is the only month during fifteen years of observations at the College when there was no precipitation of atmospheric moisture in the form of rain or snow."

The extremely mild temperature during February and December is worthy of notice in connection with the small amount of ozone, December and February both falling far below the average of preceding years in the relative amount of night ozone. Compared with the average of previous years, the relative amount of ozone, both day and night, appears to have been unusually low throughout every month. It is possible that this may have been caused by the lessened per cent of clouds. Dr. A. W. Nicholson, the meteorological observer at Otisville, Mich., in a letter dated Feb. 18, 1878, gives results of some observations he has made on this subject, and suggests that the clouds affecting the electrical conditions of the atmosphere, may in this way influence the amount of ozone.

More definite statements of variations in 1877 from the average, as regards leading meteorological conditions, are given, for the year and by months, in the comparative tables on pages following. These comparative tables are interspersed with tables and with diagrams giving statements for the year and by months, for several places of observation in the different parts of the State.

TEMPERATURE.

As before stated, the average daily temperature in 1877 was higher than the average for several preceding years. At the Agricultural College, it was 2.06 degrees higher than the average for the four preceding years; and the range of temperature for the year was 11 degrees less than the average range for the four preceding years.

Table I., page 220, gives, for the year and for each month of the year, the average temperature for 12 stations in the State, and the average at each of 13 stations. Graphic representations by months are given for 6 of these stations, in Diagram I., page 221. Table II., page 224, compares the temperature in 1877 at one of the most central of these stations, for the year and for each month of the year, with the averages for two periods of years,—the nine years from 1864 to 1872 inclusive, and the four years from 1873 to 1876 inclusive.

Table III., page 225, gives for the year and for each month of the year 1877 the extremes and the range of temperature at each of 12 localities in the State, and for the State so far as this is indicated by the localities represented. The small figures, above and to the right of the figures which indicate the maximum and minimum temperatures reached during each month at every station, show the day of the month at which the extreme of temperature was reached.

EXHIBIT 8.—*Statements of Meteorological Conditions in the Year and in each Month of the Year 1877, Compared with the Average for Corresponding Months of several Stated Periods of Years,—from Observations at the State Agricultural College, near Lansing, Michigan.*

METEOROLOGICAL CONDITIONS.	No. of Years Averaged, ending with 1876.	More (+), or Less (-), in 1877 than the Average.	METEOROLOGICAL CONDITIONS.	No. of Years Averaged, ending with 1876.	More (+), or Less (-), in 1877 than the Average.
YEAR 1877.			YEAR 1877.—*Continued.*		
High Temperature	4	+2°.06 F.	Less Day Ozone	5	-0.17*
Low Range of Temperature	4	-11°.00 F.	Less Night Ozone	5	-1.09*
Less Amount of Cloudiness.	4	-4 per ct.	High Atmospheric Pressure	2	+.063 in.
More Rainfall	4	+8.96 in.			
JANUARY.			FEBRUARY.		
Low Temperature	4	-3°.53 F.	High Temperature	4	+12°.33 F.
Usual Range of Temperat're	4	-1°.00 F.	Small Range of Temperat're	4	-16°.00 F.
Less Amount of Cloudiness.	4	-8 per ct.	Small Amount of Clouds	4	-20 per ct.
Small amount of Rainfall	4	-1.16 in.	Small Amount of Rainfall	4	-1.89 in.
Less Day Ozone	5	-0.23*	Less Day Ozone	5	-0.52*
Less Night Ozone	5	-1.17*	Less Night Ozone	5	-2.23*
High Atmospheric Pressure	2	+.018 in.	High Atmospheric Pressure	2	+.155 in.
MARCH.			APRIL.		
Low Temperature	4	-5°.16 F.	High Temperature	4	+4°.81 F.
Less Range of Temperature	4	-4°.00 F.	Usual Range of Temperat're	4	-2°.00 F.
More Clouds	4	+4 per ct.	Less Amount of Clouds	4	-4 per ct.
More Rainfall	4	+3.23 in.	More Rainfall	4	+2.08 in.
More Day Ozone	5	+0.52*	Less Day Ozone	5	-0.20*
Usual Night Ozone	5	-0.08*	Less Night Ozone	5	-0.86*
High Atmospheric Pressure	2	+.094 in.	Low Atmospheric Pressure.	2	-.053 in.
MAY.			JUNE.		
Usual Temperature	4	-0°.56 F.	Low Temperature	4	-2°.69 F.
Usual Range of Temperat're	4	0°.00	Less Range of Temperature	4	-7°.00 F.
Small Amount of Clouds	4	-17 per ct.	More Clouds	4	+2 per ct.
Less Rainfall	4	-1.13 in.	Usual Amount of Rainfall	4	-0.02 in.
Less Day Ozone	5	-0.47*	More Day Ozone	5	+0.27*
Less Night Ozone	5	-1.56*	Usual Night Ozone	5	+0.07*
High Atmospheric Pressure	2	+.021 in.	High Atmospheric Pressure	2	+.051 in.

* Degrees, by a scale of 10 degrees of coloration of Schönbein's test-paper, exposed from 7 A. M., to 2 P. M., for the day observation; and from 9 P. M. to 7 A. M. for the night observation.

Notwithstanding the marked exceptions during February, March, and December, shown in Table III., page 225, some uniformity is apparent, not only in the average temperature by months, but also in the range of temperature

EXHIBIT 8.—CONTINUED.—*Meteorological Conditions in each Month of the Year 1877, Compared with Averages for Preceding Years.*

METEOROLOGICAL CONDITIONS.	No. of Years Averaged, ending with 1876.	More (+), or Less (-), than the Average.	METEOROLOGICAL CONDITIONS.	No. of Years Averaged, ending with 1876.	More (+), or Less (-), than the Average.
JULY.			AUGUST.		
Usual Temperature	4	+0°.14 F.	Usual Temperature	4	-0°.50 F.
Usual Range of Temperat're	4	-2°.00 F.	Less Range of Temperature	4	-7°.00 F.
Usual Amount of Clouds	4	-1 per ct.	More Clouds	4	+5 per ct.
Less Amount of Rainfall	4	-0.80 in.	More Rainfall	4	+5.37 in.
More Day Ozone	5	+0.32*	More Day Ozone	5	+0.86*
Less Night Ozone	5	-0.56*	Less Night Ozone	5	-0.91*
High Atmospheric Pressure	2	+.035 in.	Usual Atmospheric Pressure.	2	+.009 in.
SEPTEMBER.			OCTOBER.		
High Temperature	4	+2°.52 F.	High Temperature	4	+5°.62 F.
Less Range of Temperature	4	-13°.00 F.	Usual Range of Temperat're	4	+1°.00 F.
Less Amount of Clouds	4	-12 per ct.	More Clouds	4	+7 per ct.
Less Amount of Rainfall	4	-1.45 in.	More Rainfall	4	+3.32 in.
More Day Ozone	5	+0.23*	Less Day Ozone	5	-0.50*
Less Night Ozone	5	-1.02*	Less Night Ozone	5	-0.92*
High Atmospheric Pressure	2	+.128 in.	High Atmospheric Pressure	2	+.104 in.
NOVEMBER.			DECEMBER.		
High Temperature	4	+1°.00 F.	High Temperature	4	+10°.74 F.
Less Range of Temperature	4	-7°.00 F.	Less Range of Temperature	4	-15°.00 F.
Usual Amount of Clouds	4	+2 per ct.	Usual Amount of Clouds	4	0.00 per ct.
More Rainfall	4	+2.25 in.	Less Amount of Rainfall	4	-0.84 in.
Less Day Ozone	5	-0.63*	Less Day Ozone	5	-1.70*
Less Night Ozone	5	-1.48*	Less Night Ozone	5	-2.32*
High Atmospheric Pressure	2	+.096 in.	High Atmospheric Pressure	2	+.099 in.

* Degrees, by a scale of 10 degrees of coloration of Schönbein's test-paper, exposed from 7 A. M. to 2 P. M., for the day observation; and from 9 P. M. to 7 A. M. for the night observation.

during the year. That the extremes of low temperature during the winter months are, in accordance with the theory of the existence of cold waves, generally simultaneous throughout the State, is shown in the Table, III., page 225. It would seem, also, from the table, that, in some months, the waves of extreme cold are more general in their movements and effects than are those of extreme heat, while in other months the reverse is true.

Table IV., page 226, compares the extremes and the range in the year 1877 and in each month of the year, at one central station, with the averages of the extremes and of the range at the same station for the four years from 1873 to 1876 inclusive. It also gives by months the extremes and the range for each of the four years of this period.

TABLE I.—*Average Temperature, in Degrees, Fahr., by Months and Year 1877, at each of 13 Stations in Michigan, as Indicated by the Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers for the State Board of Health* and by others.*

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISION OF THE STATE.†	YEAR 1877.	MONTHS, 1877.											
			Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
AVERAGE FOR 12 LOCALITIES‡	....	48.67°	19.18°	32.27°	25.92°	46.71°	58.24°	67.48°	72.80°	70.52°	63 80°	52.78°	37.57°	36.73°
Fyfe Lake*	N. W. †	...§...	....	28.14	19.04	41.59	55.42	62.31	70.14	67.47	61.36	46.76	33.08	33.80
Nirvana	W.	46.06	14.89	26.93	20.87	43.66	58.42	66.51	72.72	67.43	62.26	49.24	33.87	35.92
Agricultural College, near Lansing	C.	47.42	18.14	32.33	24.18	46.14	58.28	66.29	71.39	68.48	61.28	50.73	35.20	36.57
Thornville	B. & E.	46.90	19.23	31.07	25.48	44.50	46.04	67.20	72.26	70.42	63.59	50.00	45.37	26.74
Benton Harbor	S. W.	50.19	21.24	32.71	28.28	49.12	61.27	65.59	73.68	70.70	66.14	54.84	37.28	41.47
Battle Creek	S. C.	50.20	20.34	33.64	28.51	47.20	60.99	69.69	75.04	71.06	64.10	53.67	37.31	39.97
Coldwater	S. C.	49.92	21.14	34.01	26.54	48.33	61.43	68.89	72.90	70.78	65.39	56.46	37.79	35.32
Kalamazoo	S. C.	48.45	18.07	32.86	25.11	46.59	59.30	67.87	71.83	69.92	63.23	52.31	36.13	38.22
Mendon	S. C.	48.76	20.02	33.52	25.25	47.79	59.89	67.59	71.71	69.69	62.41	52.56	36.72	37.95
Tecumseh	S. C.	49.23	19.73	33.24	26.31	47.46	59.08	68.77	73.21	72.18	63 70	53.16	37.27	36.87
Ypsilanti	S. C.	49.84	19.03	32.43	28.68	48.37	58.70	67.66	75.14	73.33	66.31	54.11	37.10	37.27
Detroit ‖ (U. S. Signal Service Station)	S. E.	49.16	20.30	33.20	26.70	46.00	57.70	67.20	72.50	71.60	64.60	53.80	39.20	37.16
Woodmere Cemetery, near Detroit	S. E.	47.83	17.97	31.25	25.20	45.33	56.83	66.44	71.27	69.73	62.54	52.46	37.64	37.24

* The Names of Observers, their Places of Observation, and the County and Geographical Divisions of the State, in which these Places are situated, are given in Exhibit 7, page 215.

† For full name of the division and for counties in each division, see Exhibit 1, page 113.

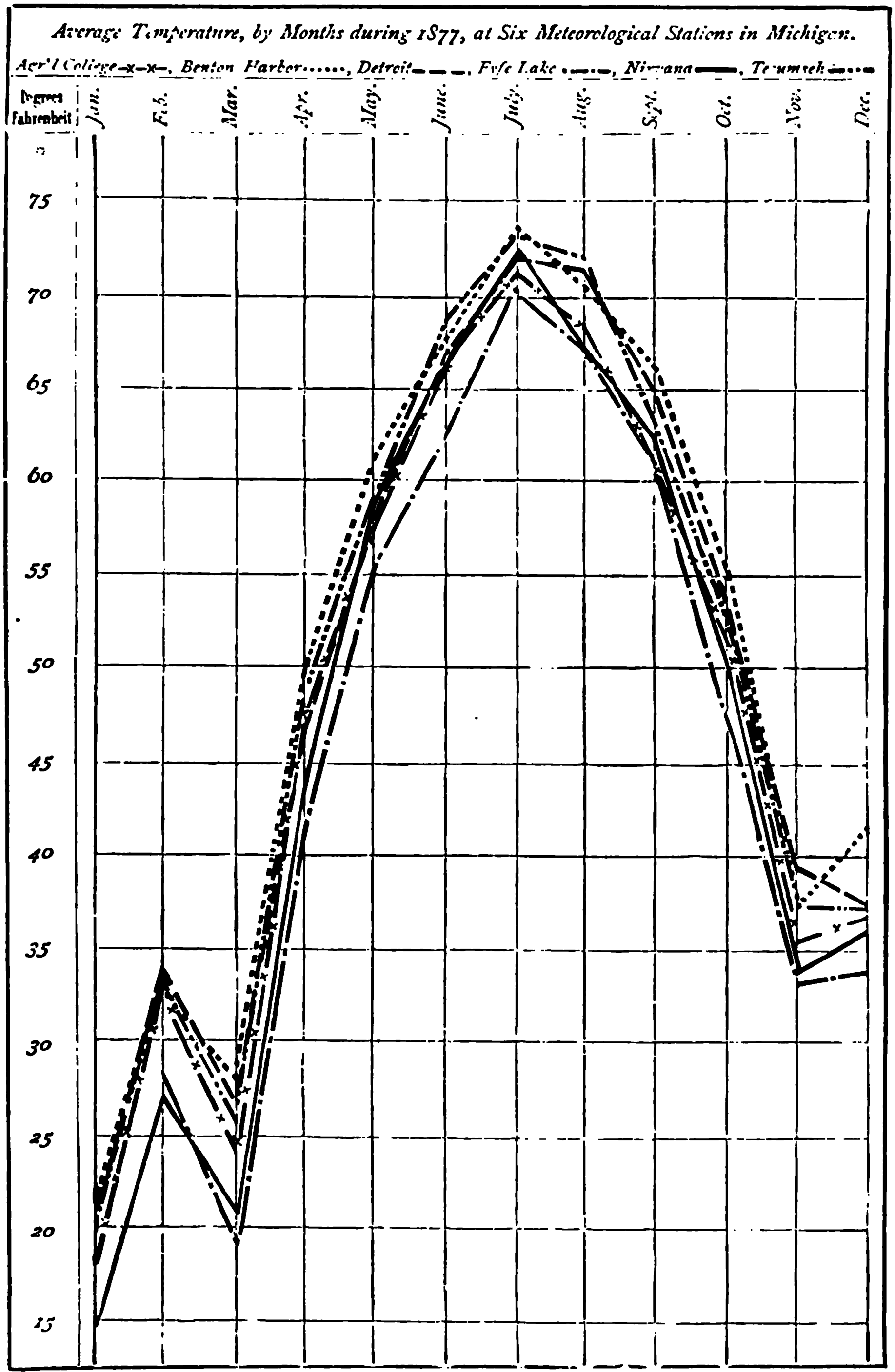
‡ This line is an average for only the 12 localities for which statements are given for each month of the year.

§ The average for the 11 months for which statements are given is 47.19°.

‖ The numbers in this line for Detroit were computed by multiplying t 9 P.M. observation by 2, adding the other two observations, and dividing the sum by 4.

NOTE.—Graphic representations of statements in 6 lines of this table are given in Diagram I., page 221.

DIAGRAM No. I.—TEMPERATURE, 1877.



*Scale, 10 degrees F. to the inch, vertically. Drawn by F. S. Kedzie. Designed by Henry B. Baker.

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The average yearly range at the Agricultural College for the four years ending with 1876, as shown in Table IV., page 226, was 118°, and the range of temperature for the year 1877 at the same station was only 107°. While the range of temperature at the Agricultural College in 1877 was 107°, the range at Nirvana, which was greater than that at any other station, was only 116°, two degrees less than the average range at the Agricultural College for the nine years ending with 1872.

In Exhibit 9, on this page, the names of the thirteen places of observation for which reports have been tabulated, are arranged in order according to latitude, the one farthest north being placed first. The average temperature, and the average atmospheric pressure, in 1877, at each of these places, are also given in this exhibit.

EXHIBIT 9.—*Latitude, Average Temperature in 1877, and Average Atmospheric Pressure in 1877, at 13 Meteorological Stations in Michigan,—the Names of the Stations being Arranged in order, by Highest Latitude.*

LOCALITIES IN ORDER OF LATITUDE,—THOSE FARTHEST NORTH, FIRST.	Latitude, North.	Longitude, west from Greenwich.	Average Temperature, 1877.*	Average Atmospheric Pressure, 1877.
Fyfe Lake	....	....	47.19°	....
Nirvana	....	....	46.06	....
Thornville	....	....	46.90	....
Agricultural College, near Lansing	42°42′	84°34′	47.42	29.066
Detroit (U. S. Signal Service Station)	42°21′	83°7′	49.16	....
Woodmere Cemetery, near Detroit	42°18′	83°5′	47.83	29.326
Battle Creek	....	....	50.20	28.997
Kalamazoo	† 42°17′	† 88°35′	48.45	29.086
Ypsilanti	† 42°14′	† 83°37′	49.84	28.915
Benton Harbor	....	....	50.19	29.547
Mendon	....	....	48.76	29.019
Tecumseh	....	....	49.25	....
Coldwater	† 41°53′	† 85°1′	49.92	....

* The lowest temperature reported during the year at any of these stations occurred at Nirvana and Fyfe Lake, March 17, and was -21° F.; the highest occurred at Benton Harbor, July 24, and was 95°; the range of these observations is 116°.

† From Tackabury's Atlas of the State of Michigan.

TABLE II.—*Comparisons of the Average Temperature (Degrees Fahr.) in the Year, and in each Month of the Year, 1877, with the Annual and Monthly Averages for the Nine Years 1864–72, and for the Four Years 1873–6.—Compiled in the office of the State Board of Health, from Records of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily, made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.*

YEARS, ETC.	ANNUAL AV.	JAN.	FEB.	MARCH.	APRIL.	MAY.	JUNE.	JULY.	AUGUST.	SEPT.	OCT.	NOV.	DEC.
9 Years, 1864–72	46.65°	20.22°	24.90°	32.18°	47.52°	57.25°	68.94°	72.12°	69.15°	59.74°	48.01°	35.98°	23.77°
4 Years, 1873–6	45.36	21.67	20.00	29.34	41.33	58.84	68.98	71.25	68.98	58.76	45.11	34.20	25.83
Average, 1877	47.42	18.14	32.33	24.18	46.14	58.28	66.29	71.39	68.48	61.28	50.73	35.20	36.57
In 1877 Higher than Average for 9 Years, 1864–72	0.77	....	7.43	....	....	1.03	....	....	....	1.54	2.72	....	12.80
In 1877 Lower than Average for 9 Years 1864–72	....	2.08	....	8.00	1.38	....	2.65	0.73	0.67	....	....	0.78	....
In 1877 Higher than Average for 4 Years 1873–6	2.06	....	12.33	....	4.81	....	....	0.14	....	2.52	5.62	1.00	10.74
In 1877 Lower than Average for 4 Years 1873–6	....	3.53	....	5.16	....	0.56	2.69	....	0.50	....	....	....	....

TABLE III.—*Exhibiting the Extremes of Temperature and the Days of the Month on which the Highest and the Lowest Temperatures occurred, by Months of the Year 1877, also the Extremes and the Range for the Year 1877, at each of 13 Stations in Michigan,—as Indicated by Daily Readings of Registering Thermometers or by Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers for the State Board of Health.**

PLACES OF OBSERVATION IN MICHIGAN.	GEOGRAPHICAL DIVISION OF THE STATE.†	YEAR 1877.			MONTHS, 1877.																							
					January.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		October.		Nov.		Dec.	
		Highest.	Lowest.	Range.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
AT 13 LOCALITIES...	....	95°	-21°	116°	63°	-14°	64°	-5°	58°	-21°	82°	10°	95°	21°	92°	34°	95°	43°	93°	43°	91°	36°	87°	25°	63°	-1°	70°	5°
Fyfe Lake*............	N. W. †	..‡	..‡	..‡	....	......	52^{21}	-1^{13}	48^{22}	-21^{17}	73^{22}	10^{2}	84^{20}	24^{2}	81^{25}	43^{11}	92^{15}	47^{20}	87^{21}	52^{16}	86^{12}	36^{21}	74^{3}	28^{22}	50^{13}	9^{10}	54^{16}	12^{2}
Nirvana..................	W......	95	-21	116	48^{30}	-4^{12}	48^{22}	-5^{13}	49^{30}	-21^{17}	79^{23}	16^{2}	95^{30}	21^{1}	88^{25}	43^{10}	93^{15}	50^{20}	87^{17}	50^{3}	84^{14}	37^{21}	79^{3}	25^{22}	53^{24}	-1^{6}	54^{21}	5^{1}
Agricultural College, near Lansing......§	C.......	93	-14	107	52^{31}	-9^{9}	56^{21}	10^{12}	51^{31}	-14^{16}	81^{23}	18^{2}	90^{19}	26^{1}	89^{30}	40^{22}	91^{15}	43^{10}	93^{1}	43^{31}	85^{30}	38^{17}	87^{1}	26^{21}	55^{14}	4^{5}	58^{19}	13^{1}
Thornville...............§	B. & E.	93	-10	103	46^{31}	-2^{17}	50^{21}	13^{13}	44^{31}	-10^{17}	79^{23}	18^{3}	90^{19}	30^{1}	86^{18}	41^{11}	92^{15}	46^{11}	93^{1}	48^{5}	83^{30}	40^{22}	83^{1}	31^{6}	57^{14}	11^{7}	59^{19}	17^{31}
Benton Harbor...........	S. W...	95	0	95	48^{30}	0^{9}	57^{22}	17^{14}	55^{22}	4^{17}	77^{23}	25^{2}	90^{31}	.....	85^{30}	49^{10}	95^{24}	60^{20}	89^{21}	58^{4}	91^{14}	51^{21}	87^{28}	34^{22}	58^{13}	17^{29}	65^{23}	18^{2}
Battle Creek.. ....§	S. C....	95	-10	105	63^{30}	-10^{9}	64^{29}	11^{12}	58^{31}	-7^{16}	82^{23}	22^{3}	92^{19}	28^{1}	92^{2}	46^{9}	95^{24}	53^{21}	91^{1}	48^{21}	87^{12}	38^{21}	87^{1}	30^{29}	63^{20}	4^{5}	70^{20}	9^{30}
Coldwater................	S. C....	92	-2	94	51^{30}	-2^{21}	55^{11}	14^{13}	52^{31}	0^{17}	70^{17}	24^{3}	89^{19}	32^{2}	84^{20}	48^{10}	90^{26}	58^{20}	92^{1}	60^{15}	82^{14}	46^{18}	82^{1}	30^{22}	55^{13}	9^{6}	57^{20}	20^{15}
Kalamazoo...............§	S. C....	90	-11	101	45^{30}	-11^{8}	56^{22}	12^{13}	49^{23}	-5^{17}	80^{23}	20^{2}	88^{19}	25^{1}	86^{2}	42^{9}	90^{26}	48^{20}	89^{1}	46^{31}	85^{30}	41^{21}	84^{1}	27^{31}	55^{14}	7^{29}	60^{20}	11^{2}
Mendon....................	S. C....	89	-6	95	50^{31}	-5^{21}	55^{11}	15^{13}	47^{22}	-6^{17}	80^{23}	26^{3}	88^{19}	33^{1}	85^{2}	51^{10}	89^{5}	56^{11}	88^{20}	55^{4}	88^{25}	42^{19}	82^{1}	31^{30}	54^{13}	9^{30}	62^{20}	10^{2}
Tecumseh.................	S. C....	93	-4	97	58^{31}	-4^{21}	56^{21}	15^{14}	50^{22}	-4^{20}	80^{23}	23^{3}	90^{19}	34^{2}	88^{25}	49^{23}	92^{26}	56^{21}	93^{2}	58^{25}	85^{30}	40^{18}	87^{1}	31^{6}	61^{17}	11^{29}	60^{17}	13^{2}
Ypsilanti..................	S. C....	91	-8	99	48^{31}	-8^{9}	54^{21}	15^{13}	50^{31}	7^{17}	77^{23}	28^{3}	89^{19}	30^{1}	87^{18}	53^{11}	91^{26}	54^{2}	91^{2}	62^{15}	84^{28}	52^{3}	82^{3}	30^{22}	57^{14}	13^{29}	54^{15}	15^{2}
Detroit...................§	S. E....	90	-5	95	48^{31}	-5^{9}	58^{21}	16^{13}	50^{31}	-2^{17}	75^{23}	20^{3}	86^{18}	32^{2}	85^{18}	42^{23}	90^{26}	54^{7}	88^{1}	56^{15}	83^{30}	43^{18}	84^{1}	34^{22}	57^{15}	11^{30}	58^{19}	18^{2}
Woodmere Cemetery, near Detroit......§	S. E....	92	-6	98	42^{30}	-6^{9}	54^{21}	15^{13}	43^{2}	-2^{17}	74^{23}	23^{3}	85^{19}	33^{12}	86^{19}	34^{23}	90^{27}	47^{7}	92^{2}	49^{4}	83^{16}	36^{22}	83^{1}	29^{6}	59^{16}	11^{30}	60^{20}	13^{2}

NOTE.—The small figures above and at the right of numbers denoting the degrees of temperature, state the day of the month on which the highest or the lowest temperature occurred. Further remarks on this table are given on pages 217-219.

* The Names of Observers, their Places of Observation, and the County and Geographical Division of the State, in which these Places are situated, are given in Exhibit 7, page 215. † For full name of the division and for counties in each division, see Exhibit 1, page 113.

‡ At Fyfe Lake, the highest for the 11 months for which statements are given, was 92°; the lowest, was -21°; and the range was 113°.

§ Determined by daily readings of registering thermometers. For Stations not thus marked the extremes were determined from daily observations at 7 A. M., 2 P. M., and 9 P. M. The observations with the registering thermometers have been made and recorded for the preceding day, at 7 A. M. The first observation with the self-registering thermometers at Woodmere Cemetery was recorded May 12.

TABLE IV.—*Comparison of the Extremes and the Range of Temperature (Degrees Fahr.) during the Year, and during each Month of the Year 1877, with the Average of the Extremes and of the Range for the Four Years 1873-6; also Statement of the Extremes and of the Range for each of the Four Years 1873-6.—Compiled in the office of the State Board of Health, from Records of Observations made with Registering Thermometers (except for the first two Months of 1873, and for those two Months with an Ordinary Thermometer at 7 A. M., 2 P. M., and 9 P. M.) Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.*

MONTHS.	1873.			1874.			1875.			1876.			AVERAGE FOR 4 YEARS, 1873-6.			1877.			IN 1877 HIGHER (+), OR LOWER (-), THAN AVERAGE FOR YEARS 1873-6.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
Annual Av....	94°	-30°	124°	101°	-7°	108°	92°	-33°	125°	96°	-19°	115°	*96°	*-22°	*118°	93°	-14°	107°	-3°	+8°	-11°
January.......	43°	-30°	73°	59°	-7°	66°	35°	-13°	48°	65°	6°	59°	51°	-11°	62°	52°	-9°	61°	+1°	+2°	-1°
February.....	49	-13	62	48	-1	49	42	-33	75	59	-1	60	50	-12	62	56	10	46	+6	+22	-16
March	57	-12	69	67	8	59	75	-11	86	60	0	60	65	-4	69	51	-14	65	-14	-10	-4
April	82	24	58	68	3	65	80	0	80	74	16	58	76	11	65	81	18	63	+5	+7	-2
May	84	27	57	96	21	75	89	24	65	89	31	58	90	26	64	90	26	64	0	0	0
June	94	42	52	95	34	61	89	33	56	95	42	53	93	38	56	89	40	49	-4	+2	-7
July	92	44	48	93	43	55	92	44	48	96	46	50	95	44	50	91	43	48	-4	-1	-2
August	94	44	50	101	41	60	93	35	58	96	36	60	96	39	57	93	43	50	-3	+4	-7
September....	89	26	63	95	30	65	94	26	68	80	36	44	90	30	60	85	38	47	-5	+8	-13
October........	79	16	63	76	16	60	77	18	59	75	19	56	77	18	60	87	26	61	+10	+8	+1
November...	56	1	55	70	3	67	60	2	58	62	12	50	62	5	58	55	4	51	-7	-1	-7
December....	64	10	54	50	-6	56	70	-1	71	41	-19	60	56	-4	60	58	13	45	+2	+17	-15

* For the four years,—highest, 101°; lowest, -33°; range, 134°.

HUMIDITY OF THE ATMOSPHERE.

The humidity of the atmosphere is expressed in the tables in this article by the number of grains of vapor of water in a cubic foot of air, as determined, from records of observations of the wet-bulb and dry-bulb thermometers, by means of Glaisher's Psychrometrical Table,—Table XII.—in "Tables Psychrometrical and Physical" by Arnold Guyot, P. D., LL. D., etc., published by the Smithsonian Institution in 1859.

The writer of this article has, for several years, maintained that the old view that what has been called the "relative humidity," stated by per cent of saturation, has a close relation to the diseases of mankind, must give way to the more rational view that it is the *absolute* humidity that has the closest relation to such diseases, and that for any real comparison of the relative humidity of different localities, or of the same locality in different times, so far as relates to its effects upon living persons, we must employ statements of the absolute humidity, which is usually stated in grains of vapor in a cubic foot of air, ascertained by means of wet-bulb and dry-bulb thermometers, and tables, as mentioned in the preceding paragraph.[*] One of the main reasons why this is true, is that the air taken into the lungs of a living person, clothed as is usual in civilized countries, is so large in amount, compared with what comes in contact with other parts of the body, that the effects produced in the air passages are among the greatest effects of the atmosphere on the human body; so far as relates to humidity of the air, the effects in the air passages are probably the greatest. The air passages normally are moist and at nearly a uniform temperature, so that the air exhaled is saturated, or nearly so, and that at nearly the uniform temperature of the body; consequently the amount of vapor of water exhaled does not vary much, whatever may be the varying amount inhaled. When it is considered how greatly the capacity of air for moisture varies with its temperature,[†] it seems plain that the drying effects on the air passages must be very great when the air inhaled is cold, even though its per cent of saturation be great.

Although statements of the so-called "relative humidity" are not given in this article, they are given for the several months of the year 1877 in Exhibits 11, 12, 13, and 14, in the article on Weekly Reports of Diseases in Michigan, 1877, in this Report; and for the years 1870, 1871, and 1872, in connection with tables of deaths from various diseases in those years, in the volumes of Vital Statistics of Michigan for those years, where supposed relations of relative humidity to deaths from those diseases may be studied. It is possible that a study of the relative humidity of the air, in connection with the influence of cold, in the production of diseases of the air passages, may lead to valuable results.

As being of interest in connection with this subject, the following paragraphs from the "Directions for Taking Observations and for Care of Instruments" on the back of the Meteorological Register (supplied to observers by this Board), are here printed:

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[*] If the reader desires to follow the writer's discussion of this subject, remarks thereon, and tables showing deaths from certain diseases in connection with meteorological conditions at the same time, may be found on pages 294-295,—Vital Statistics of Mich., 1870; pages 309-322,—Vital Statistics of Mich., 1871; pages 358-383,—Vital Statistics of Mich., 1872; and on following pages in this Report, in the article on Weekly Reports of Diseases in Michigan in 1877, where the close relation of the absolute humidity of the air to certain diseases, is very strongly indicated.

[†] According to the tables usually employed, air saturated with vapor, at 32° F. contains 2.37 grains in each cubic foot; at 70° F. it contains 8.00 grains; and at 98° F. it contains 18.69 grains of vapor of water in each cubic foot of air. The internal temperature of the healthy human body is 98.5° F.

"The amount of moisture present in the air is a matter of great importance, both in a meteorological and in a sanitary point of view. The vapor of water was formerly regarded as dissolved in the atmosphere; but it is now regarded as forming an independent atmosphere pervading the aërial atmosphere. The quantity of water in a state of vapor which a given space can contain depends on the temperature. When a given space has as much water in a state of vapor as it can hold at a given temperature, it is said to be saturated with vapor. If the temperature be lowered, a portion of the vapor will be condensed into water, but the space will still be saturated. If the temperature be raised and no more vapor be added, the space will be only partially saturated. The numbers under the head of "Relative Humidity," therefore, denote the per cent of saturation, full saturation being indicated by 100, and half saturation, by 50. The relative humidity is determined from the readings of the *wet* and *dry* bulb thermometers by means of tables.

"The humidity of the air may be measured in several ways, but the easiest is by means of the *wet-bulb* and *dry-bulb* thermometers. The drier the air, or the further it is from saturation with watery vapor, the more rapid will be the evaporation from a wet surface; and, consequently, the greater will be the cooling of the body from which evaporation proceeds. If the air is saturated, there will be no evaporation, and the wet and dry bulb thermometers will mark the same temperature; but, under all other circumstances, the wet-bulb will mark a lower temperature than does the dry-bulb. The wet and dry bulb thermometers therefore measure the rapidity of evaporation at a given temperature, and from this we deduce the amount of watery vapor present in the air.

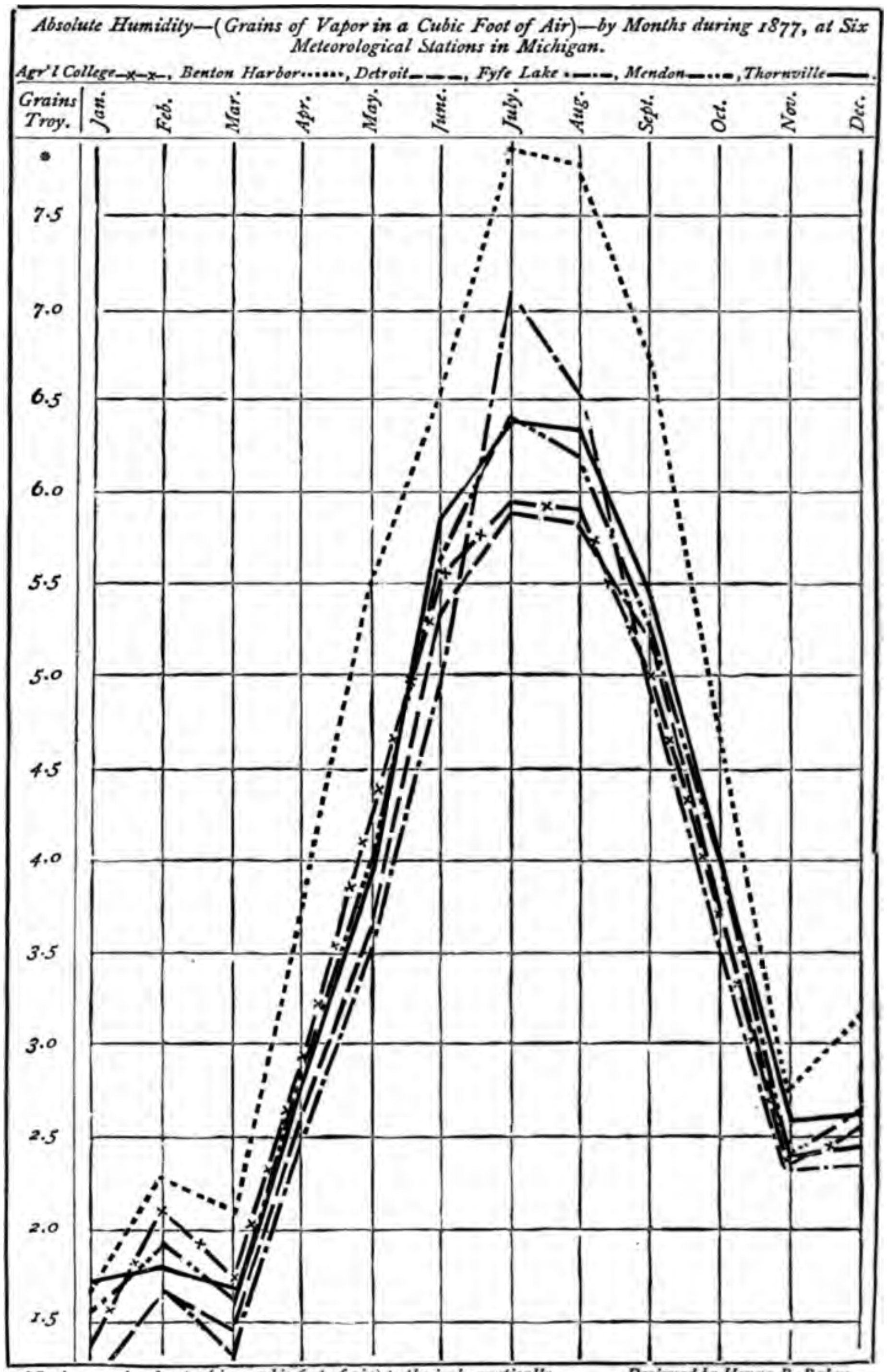
"The psychrometer consists of two delicate thermometers, the bulb of one being covered with a thin cloth kept constantly wet, and evaporation being permitted by freely exposing the instrument to the air. It is important that the wet bulb be kept wet at all times, or, if this is not secured, it should be wet with *pure water* at least fifteen minutes before each observation. Water will evaporate from the solid as well as the liquid state. When the temperature is at or below freezing point, the wet bulb should be kept covered with a thin layer of ice. If the temperature of the air is below freezing point, and water is placed on the wet bulb, the temperature as marked by this thermometer will be 32° till all the water is frozen. It is, therefore, very important to wet the wet bulb fifteen to thirty minutes before each observation, unless it is entirely covered with ice. If the wet-bulb marks 32° while the dry-bulb marks a lower temperature, it is because the water of the wet bulb is freezing, but not entirely frozen.

"The psychrometer should be so placed as to be freely exposed to the air, observing all the precautions noted in connection with 'Thermometer in open air.' The covering of the wet-bulb should be renewed often enough to secure a clean covering; for if too much dust is allowed to collect upon it, it will be difficult to secure adequate moistening of the covering and proper evaporation therefrom. By means of a syringe it can be purified somewhat without removing it. Rain-water should be used with this instrument."

In Table V., page 231, is stated by months and for the year 1877 the average absolute humidity of the atmosphere, or average grains of vapor in a cubic foot of air, at each of 12 stations in Michigan, as determined by observations made with the psychrometer at 7 A. M., 2 P. M., and 9 P. M., daily. The average of statements for 9 of these localities, at which statements are made for the full year, is also given. Diagram II., page 230, represents graphically by months the statements for six of these localities. It may profitably be compared with Diagrams Nos. 1, 2, and 3, relative to Diseases in Michigan in 1877, on pages 292, 295, and 298, and also with Exhibits 11–14, pages 302–309.

Table VI., page 232, gives for one of the central stations a comparison of the absolute humidity in 1877 with monthly and annual averages for the ten years from 1865 to 1874 inclusive, as computed in the State Department, for the Vital Statistics of Michigan. As thus compared, the average humidity in 1877 was greater, by 0.16 grains of vapor in a cubic foot of air, than the average for these ten years.

DIAGRAM No. II.—HUMIDITY, 1877.



**Scale, 1 grain of vapor (in a cubic foot of air) to the inch, vertically.* *Designed by Henry B. Baker.*

Drawn by F. S. Kedzie. MICH. ENG. CO.

TABLE V.—*The Average Number of Grains of Vapor in a Cubic Foot of Air (Absolute Humidity), for Months and Year 1877, at 12 Stations in Michigan,—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers for the State Board of Health.**

PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	YEAR 1877.	MONTHS, 1877.											
			Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
AVERAGE FOR 9 LOCALITIES‡	....	3.71	1.37	1.87	1.61	2.83	4.10	5.67	6.33	6.24	5.37	4.08	2.46	2.61
Fyfe Lake*	N. W.†	...§...	....	1.67	1.29	2.45	3.53	4.95	7.10	6.53	4.92	3.51	2.31	2.35
Nirvana	W.	...‖...	....	1.59	1.19	2.30	3.70	5.03	5.84	5.44	4.89	3.72	2.23	2.38
Agricultural College, near Lansing	C.	3.63	1.39	2.10	1.73	2.85	4.16	5.52	5.96	5.94	5.03	3.80	2.44	2.58
Thornville	B. & E.	3.78	1.71	1.83	1.68	2.75	4.10	5.81	6.40	6.35	5.44	3.99	2.61	2.66
Benton Harbor	S. W.	4.58	1.69	2.29	2.11	3.68	5.47	6.56	7.85	7.75	6.78	4.80	2.75	3.17
Battle Creek	S. C.	3.75	1.20	1.81	1.68	2.68	4.22	5.85	6.15	6.66	5.46	4.26	2.33	2.64
Coldwater	S. C.	3.52	1.23	1.88	1.50	2.82	3.68	5.30	5.84	5.72	5.02	4.47	2.38	2.41
Kalamazoo	S. C.	3.53	1.36	1.75	1.38	2.63	3.84	5.38	6.40	5.81	5.08	3.86	2.32	2.59
Mendon	S. C.	3.71	1.54	1.94	1.62	2.84	4.02	5.67	6.44	6.19	5.24	3.97	2.44	2.66
Tecumseh	S. C.	...¶...	....	....	....	....	....	....	....	6.02	5.13	4.12	2.60	2.57
Detroit	S. E.	3.46	1.15	1.67	1.45	2.57	3.64	5.37	5.92	5.85	5.19	3.80	2.46	2.47
Woodmere Cemetery, near Detroit	S. E.	3.46	1.06	1.58	1.32	2.69	3.81	5.54	6.04	5.92	5.12	3.74	2.38	2.34

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* The names of Observers, their Places of Observation, and the County and Geographical Division of the State, in which these Places are situated, are given in Exhibit 7, page 215.

† For full name of the division and for counties in each division, see Exhibit 1, page 113.

‡ This line is an average for only the 9 localities for which statements are given for each month of the year.

§ The average for the 11 months for which statements are given, is 3.69.

‖ The average for the 11 months for which statements are given, is 3.49.

¶ The average for the 5 months for which statements are given, is 4.09.

Graphic representations of statements in six lines of this table are given in Diagram II., page 230.

TABLE VI.—*Comparison of the Absolute Humidity (Grains of Vapor in a Cubic Foot of Air) in the Year and in each Month of the Year 1877,* with the Average for the Ten Years 1865–1874.*—Observations at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

YEARS, ETC.	Annual.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Ten Years, 1865–74	*3.47	1.37	1.46	1.63	2.68	3.88	5.79	6.72	6.16	4.93	3.20	2.07	1.48
1877..................	*3.63	1.39	2.10	1.73	2.85	4.16	5.52	5.96	5.94	5.03	3.80	2.44	2.58
In 1877 More than Av. for 10 Years, 1865–74............	0.16	0.02	0.64	......	0.17	0.28	......	......	......	0.10	0.60	0.37	1.10
In 1877 Less than Av. for 10 Years, 1865–74	......	......	......	0.10	......	......	0.27	0.76	0.22	......	......	......	......

* Ten years, 1865–1874 computed in the State Department, for the Vital Statistics of Michigan from statements of Temperature and Force of Vapor combined. Year 1877 computed in the Office of the State Board of Health, from readings of the dry-bulb and wet-bulb thermometers.

CLOUDINESS.

Three observations of the aspect of the sky are recorded daily. The per cent of cloudiness is designated by figures, 100 indicating entire cloudiness; 50, that half of the sky is covered with clouds; 0, that no clouds are visible; and any intermediate number, the intermediate per cent of cloudiness.

TABLE VII.—*Average Per Cent of Cloudiness. by Months and Year 1877, at 13 Stations in Michigan.—Average of Observations made Daily at 7. A. M., 2 P. M., and 9 P. M., by Observers for the State Board of Health.**

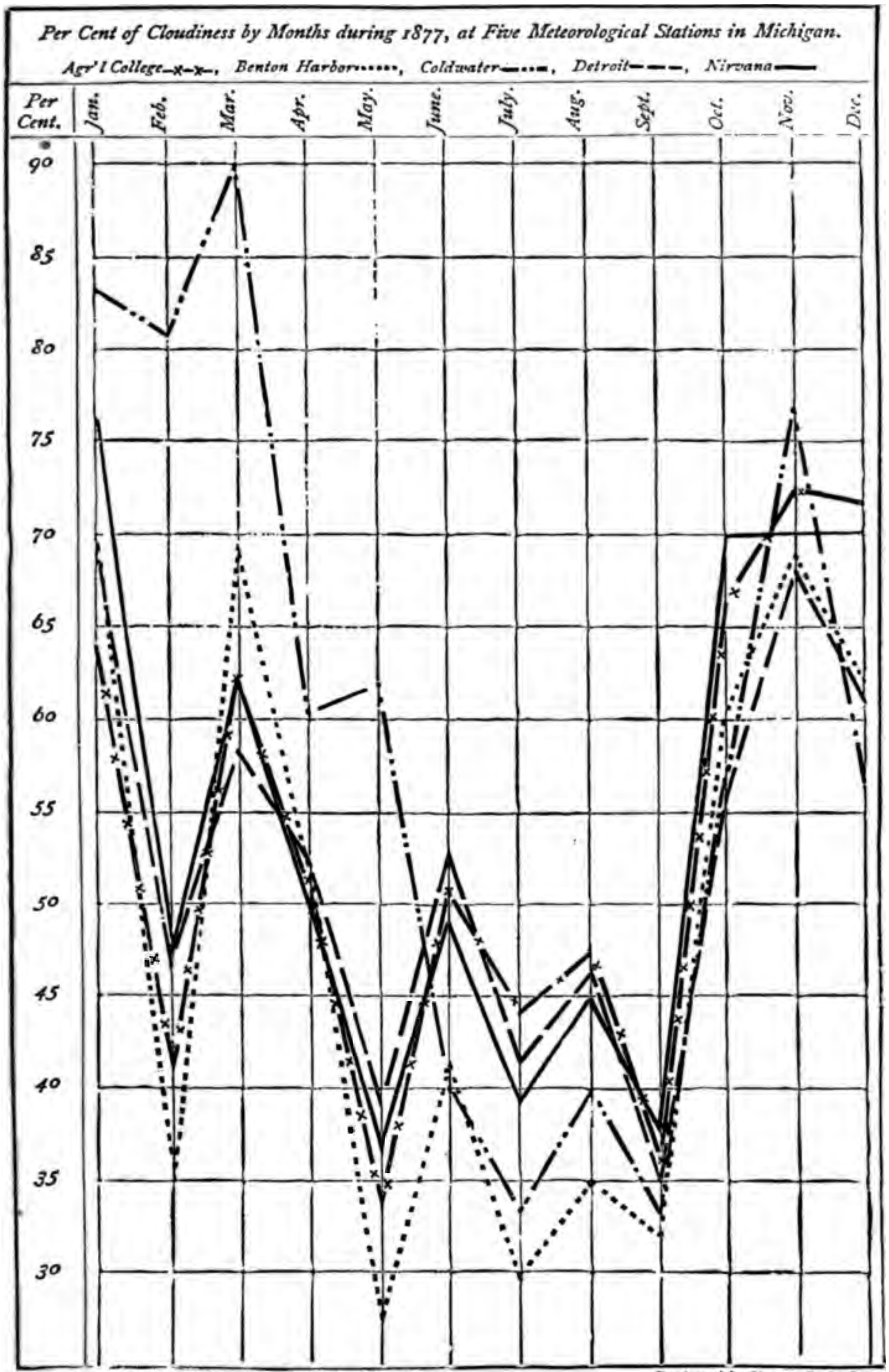
PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISION OF THE STATE.†	YEAR 1877.	MONTHS, 1877.											
			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
AV. FOR 13 LOCALITIES......	....	51	65	44	63	47	36	47	36	42	35	63	71	68
Fyfe Lake*.....................	N. W.†....	57	73	57	61	48	33	52	41	45	41	80	75	76
Nirvana..........................	W..........	54	76	48	62	50	37	49	39	45	37	70	70	70
Agricultural College, near Lansing..................	C............	53	64	41	62	50	34	51	44	47	36	66	73	72
Thornville	B. & E.....	50	61	44	65	42	31	39	46	45	30	64	69	62
Benton Harbor................	S. W.......	48	69	36	69	51	28	41	30	35	32	59	69	62
Battle Creek....................	S. C.......	49	56	36	57	43	39	47	35	45	31	61	74	67
Coldwater.......	S. C.......	59	83	81	90	60	62	40	33	40	33	57	77	57
Kalamazoo......................	S. C.......	61	79	51	70	54	47	61	45	51	41	75	77	81
Mendon	S. C.......	45	63	36	57	41	23	37	23	38	31	52	69	68
Tecumseh	S. C.......	39	50	30	50	32	25	34	19	24	20	54	64	66
Ypsilanti.........................	S. C.......	56	59	42	63	51	45	58	40	44	64	66	70	73
Detroit........	S. E.......	52	68	47	58	52	39	53	41	46	35	56	68	61
Woodmere Cemetery, near Detroit...............	S. E.......	45	47	28	59	42	30	45	29	46	29	56	67	64

* The names of Observers, their Places of Observation, and the County and Geographical Divisions of the State, in which these places are situated, are given in Exhibit 7, page 215.

† For full name of the division and for counties in each division, see Exhibit 1, page 113.

Graphic representations of some of the statements in Table VII., may be seen in Diagram No. III., page 233.

DIAGRAM No. III.—CLOUDINESS, 1877.



*Scale, 10 per cent of Cloudiness to the inch, vertically.

Designed by Henry B. Baker.

Drawn by F. S. Kedzie.

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Table VII., page 232, gives statements for the year and for each month of the year 1877, of the average per cent of cloudiness at each of 13 stations in the State, and an average for all the 13 stations. In Diagram III., page 233, the statements for five of these localities are graphically represented.

Table VIII., on this page, compares the averages for the year and for each month of the year 1877 with the annual and monthly averages for the ten years from 1864 to 1872 inclusive, and with those for the four years from 1873 to 1876 inclusive, at the Agricultural College. The average for the year 1877 is less than the annual average for each of these periods. In only two months were the monthly averages in 1877 greater than the averages for the corresponding months of the nine years 1864–1872; and in only 4 months were they greater than the averages for the corresponding months of the four years 1873–1876.

TABLE VIII.—*Comparison of the Average Per Cent of Cloudiness in the Year and in each Month of the Year 1877, with the Average for the Nine Years 1864–72, and for the Four Years 1873–6.—Observations at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

MONTHS.	For 9 Years 1864–72.	For 4 Years 1873–6.	1877.	In 1877 More (+), or Less (-), than Average for 9 Years 1864–72.	In 1877 More (+), or Less (-), than Average for 4 Years 1873–6.
Annual Average	61	57	53	-8	-4
January	75	72	64	-11	-8
February	66	61	41	-25	-20
March	66	58	62	-4	+4
April	61	54	50	-11	-4
May	54	51	34	-20	-17
June	51	49	51	0	+2
July	50	45	44	-6	-1
August	52	42	47	-5	+5
September	53	48	36	-17	-12
October	59	59	66	+7	+7
November	65	71	73	+8	+2
December	77	72	72	-5	0

RAIN AND SNOW.

The simplest way of measuring the amount of precipitation of atmospheric moisture would be to expose a cylindrical vessel with vertical sides freely to the rain or snow in a position where surrounding buildings, trees, etc., would not disturb the rainfall, and to measure the depth of water caught in each storm. With a rain-guage more accurate results can be secured. To ascertain the amount of water in any fall of snow, a column of the depth of snow of the same area as that of the guage, is melted and measured as so much rain. It is usually stated that ten inches of snow will make one inch of water.

TABLE IX.—*Inches of Rain and Melted Snow, for Months and Year 1877, at 13 Stations in Michigan, as Compiled from Daily Observations made by Observers for the State Board of Health.**

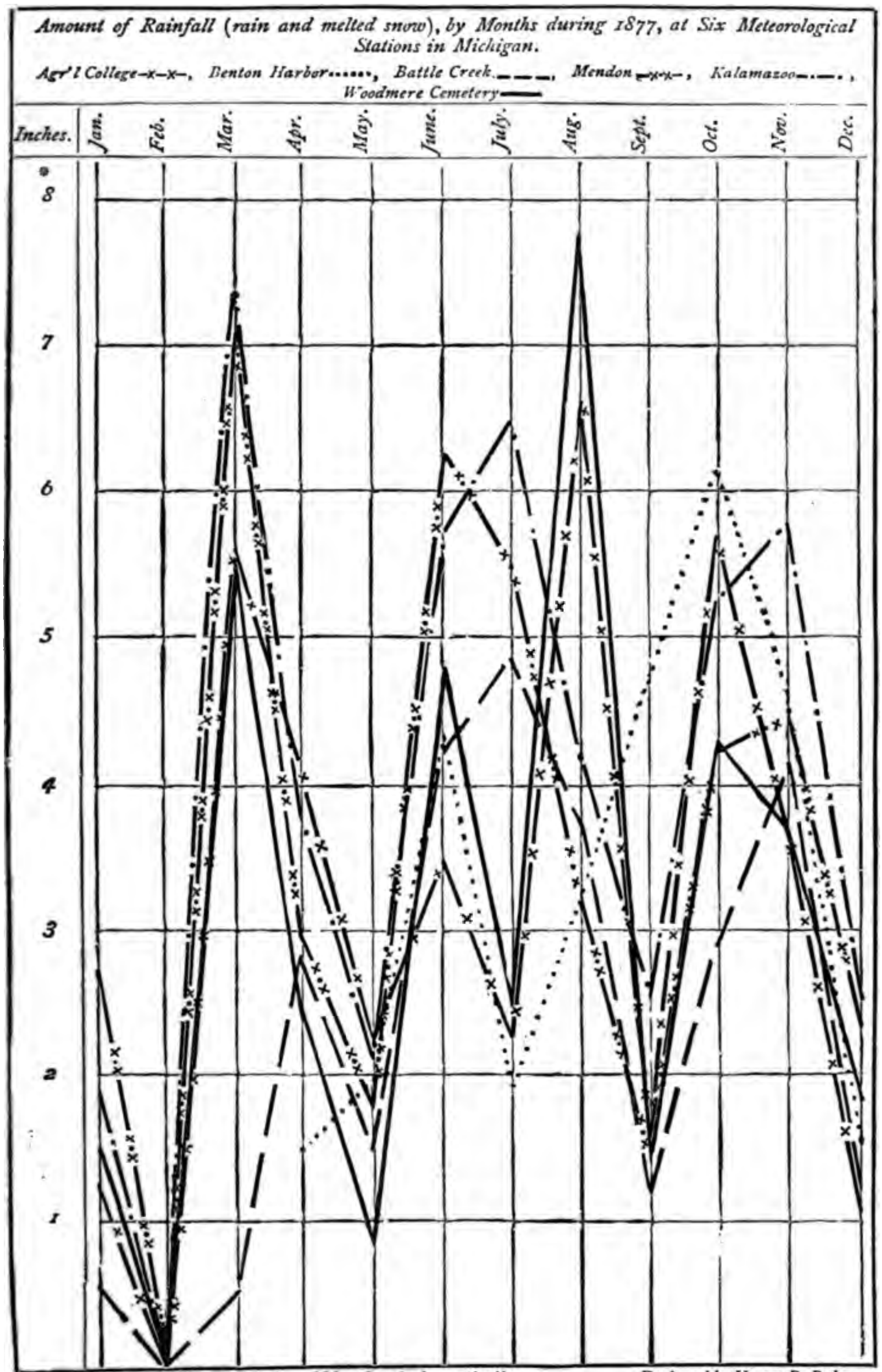
PLACES OF OBSERVATION IN MICHIGAN.*	GEOGRAPHICAL DIVISION OF THE STATE.†	YEAR 1877.	MONTHS, 1877.											
			Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
AVERAGE FOR 13 LOCALITIES	....	35.24	1.57	0.03	4.22	2.83	1.49	4.60	3.06	5.00	1.62	5.02	4.23	1.58
Fyfe Lake*	N. W. †	24.50	1.10	0.10	0.90	2.00	1.24	3.60	2.06	4.89	2.19	2.73	2.00	1.69
Nirvana	W.	39.44	2.48	0.09	3.67	2.06	1.99	4.06	2.99	4.42	1.27	9.79	4.48	2.14
Agricultural College, near Lansing	C.	37.40	1.33	0.00	5.58	4.14	2.23	3.53	2.25	6.57	1.38	5.69	3.67	1.03
Thornville	B. & E.	33.05	2.00	0.00	4.67	2.75	1.63	2.54	1.78	6.69	1.31	4.66	3.49	1.53
Benton Harbor	S. W.	35.59	1.70	0.00	4.20	1.48	1.98	4.32	1.92	3.13	4.70	6.10	4.61	1.50
Battle Creek	S. C.	27.40	0.50	0.00	0.50	2.85	1.50	4.25	4.85	3.64	1.17	2.94	4.12	1.08
Coldwater	S. C.	36.47	1.60	0.00	1.50	3.09	1.55	6.17	5.10	4.03	1.95	5.50	4.38	1.60
Kalamazoo	S. C.	47.78	1.91	0.12	7.33	3.89	2.10	5.67	6.50	4.18	2.55	5.28	5.77	2.48
Mendon	S. C.	42.07	2.75	0.00	7.02	2.99	1.81	6.20	5.54	3.31	1.51	4.17	4.46	2.31
Tecumseh	S. C.	30.67	1.17	0.00	4.50	3.03	0.88	4.72	1.41	3.80	0.90	4.35	4.34	1.57
Ypsilanti	S. C.	32.61	1.12	0.00	4.02	2.90	0.82	5.13	1.34	5.23	0.60	5.08	6.07	0.30
Detroit	S. E.	35.02	1.23	0.04	5.43	3.27	0.80	4.80	1.57	7.25	0.39	4.70	4.06	1.49
Woodmere Cemetery, near Detroit	S. E.	36.11	1.52	0.01	5.49	2.42	0.86	4.79	2.42	7.82	1.18	4.24	3.60	1.76

* The Names of Observers, their Places of Observation, and the County and Geographical Division of the State in which these Places are situated, are given in Exhibit 7, page 215.

† For full name of the division and for counties in each division, see Exhibit 1, page 113.

Graphic representations of statements in six lines of this table are given in Diagram IV., page 237.

DIAGRAM No. IV.—RAINFALL, 1877.



*Scale, one inch of Rainfall to four-fifths of an inch, vertically.
Drawn by F. S. Kedzie.
MICH. ENG. CO.
Designed by Henry B. Baker.

Table IX., page 236, states, for the year and for each month of the year, the inches of rain and melted snow at 13 stations in the State, and also an average for all the 13 stations. In Diagram IV. the statements for 6 stations are graphically represented by months. Table X. compares, by annual and monthly statements, the rainfall in 1877 with the averages for the nine years from 1864 to 1872 inclusive, and with the averages for the four years from 1873 to 1876 inclusive.

The amount of precipitation during the year 1877 was far above the average for preceding years, although somewhat unevenly and unusually distributed through the months. August, which is generally considered to be a month of little rainfall, is here shown to have had an average precipitation of 5 inches.

The variation in the precipitation of moisture in the different months was peculiar, varying from 0.02 inches in February to 5.02 inches in October, on the average throughout the State. Seven out of thirteen stations reported no precipitation during February, the greatest amount of precipitation reported during that month being 0.12 inches, at Kalamazoo.

The maximum amount of rainfall during any one month was 7.33 inches during March, at Kalamazoo.

While the amount of rainfall in 1877 was far above the average for nine years ending with 1872, the per cent of cloudiness was much less, especially in February and May.

TABLE X.—*Comparison of the Inches of Rain and Melted Snow during the Year and during each Month of the Year 1877, with the Averages for the Nine Years 1864–1872, and for the Four Years 1873–6.—Observations at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

MONTHS.	Av. for Nine Years 1864–1872.	Av. for Four Years 1873–1876.	1877.	In 1877 More (+), or Less (-), than Av. for Nine Years 1864–1872.	In 1877 More (+), or Less (-), than Av. for Four Years 1873–1876.
ANNUAL AVERAGE	30.41	28.44	37.40	+6.99	+8.96
January	1.55	2.49	1.33	-0.22	-1.16
February	1.77	1.89	0.00	-1.77	-1.89
March	2.71	2.35	5.58	+2.87	+3.23
April	3.47	2.06	4.14	+0.67	+2.08
May	2.62	3.36	2.23	-0.39	-1.13
June	4.13	3.55	3.53	-0.60	-0.02
July	3.61	3.05	2.25	-1.36	-0.80
August	2.71	1.20	6.57	+3.86	+5.37
September	3.19	2.83	1.38	-1.81	-1.45
October	1.95	2.37	5.69	+3.74	+3.32
November	1.85	1.42	3.67	+1.82	+2.25
December	1.86	1.87	1.03	-0.83	-0.84

For remarks on Ozone, see page 246.

TABLE XI.—*Relative Amount of Ozone in the Atmosphere, by Day and by Night during the year and during each Month of the Year 1877, at 12 Stations in Michigan, as Indicated by Averages of Observations Made Daily by Exposing Schönbein's Test-paper from 7 A., M. to 2 P. M., for the Day Observation, and from 9 P. M., to 7 A. M., for the Night Observation,—Recorded according to a Scale of 10 Degrees of Coloration of the Test-paper, by Observers for the State Board of Health.**

PLACES OF OBSERVATION IN MICHIGAN.*	Geographical Division of the State.†	Year 1877.		MONTHS, 1877.																							
				Jan.		Feb.		March.		April.		May.		June.		July.		August.		Sept.		Oct.		Nov.		Dec.	
		Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.	Day.	Night.
AVERAGE FOR 10 STATIONS‡	....	2.21	2.31	2.63	3.23	1.83	1.96	2.47	3.22	1.68	1.97	1.68	1.50	1.97	2.15	1.84	1.69	2.40	1.78	2.21	1.89	2.35	2.47	2.81	3.08	2.62	2.75
Fyfe Lake*	N. W.†	1.84	1.92	2.13	2.35	1.50	1.36	1.52	1.81	1.47	1.47	1.52	1.68	1.67	1.80	1.71	2.06	2.29	2.16	2.30	2.50	2.13	2.10	2.27	2.20	1.52	1.55
Nirvana	W.	2.45	2.36	4.56	5.40	2.48	2.89	3.29	4.69	1.52	2.00	1.50	1.06	1.40	1.29	1.58	0.79	2.31	1.35	2.58	1.80	2.35	1.85	2.95	2.53	2.82	2.66
Agricultural College, near Lansing	C.	3.66	3.33	4.87	5.03	4.54	4.14	5.29	6.06	3.70	4.27	3.29	2.94	3.17	2.90	2.71	1.77	3.42	1.03	2.93	1.53	3.20	3.19	3.60	3.73	3.17	3.37
Thornville	B. & E.	1.88	2.29	2.39	3.00	1.32	1.43	1.84	3.07	0.97	1.27	0.71	0.73	1.17	2.07	1.00	1.77	1.87	2.10	2.27	2.33	3.03	3.58	3.43	3.83	2.55	2.26
Benton Harbor	S. W.	§	‖	4.93	5.52	4.29	4.29	4.50	5.87	3.21	4.72	3.12	3.44	3.63	4.60	2.83	3.06	3.43	3.28	1.04	0.96	1.35	1.07	....	....	....	....
Battle Creek	S. C.	2.06	2.21	1.63	2.68	1.66	1.25	1.97	2.55	1.22	1.46	1.50	1.20	1.40	1.77	1.58	1.50	2.13	1.40	2.33	1.83	2.68	3.35	3.77	4.40	2.84	3.16
Coldwater	S. C.	2.30	2.00	2.96	3.93	1.30	1.05	2.89	3.07	1.86	1.27	1.93	0.87	2.30	1.62	2.54	1.16	2.76	1.87	2.18	1.61	1.55	1.65	2.00	2.00	3.35	3.87
Kalamazoo	S. C.	2.16	2.47	2.50	2.55	2.26	2.48	2.77	3.39	2.13	2.60	1.74	1.55	1.69	2.33	1.74	2.10	2.29	2.65	1.87	1.97	2.10	2.23	2.50	3.04	2.29	2.74
Mendon	S. C.	2.01	1.87	1.15	0.89	1.00	0.86	1.87	2.32	1.23	1.34	1.21	0.79	2.85	3.38	1.84	1.39	2.87	1.23	1.93	1.67	2.13	2.29	3.07	3.50	2.94	2.83
Tecumseh	S. C.	2.79	3.46	3.26	5.26	1.68	2.93	2.90	4.29	1.67	3.07	2.74	3.32	2.83	3.27	2.23	2.35	2.87	3.00	2.70	2.57	3.23	3.55	3.37	3.90	3.94	4.00
Ypsilanti	S. C.	0.94	1.15	0.84	1.22	0.57	1.19	0.35	0.95	1.02	0.92	0.65	0.85	1.25	1.05	1.47	2.02	1.14	0.96	1.02	1.09	1.13	0.87	1.12	1.62	0.73	1.02
Woodmere Cemetery, near Detroit	S. E.	....	....	....	....	....	....	....	....	2.37	2.92	2.00	1.84	1.47	1.27	1.16	1.03	3.23	2.48	3.87	2.33	4.26	3.74	5.17	5.20	5.03	4.90

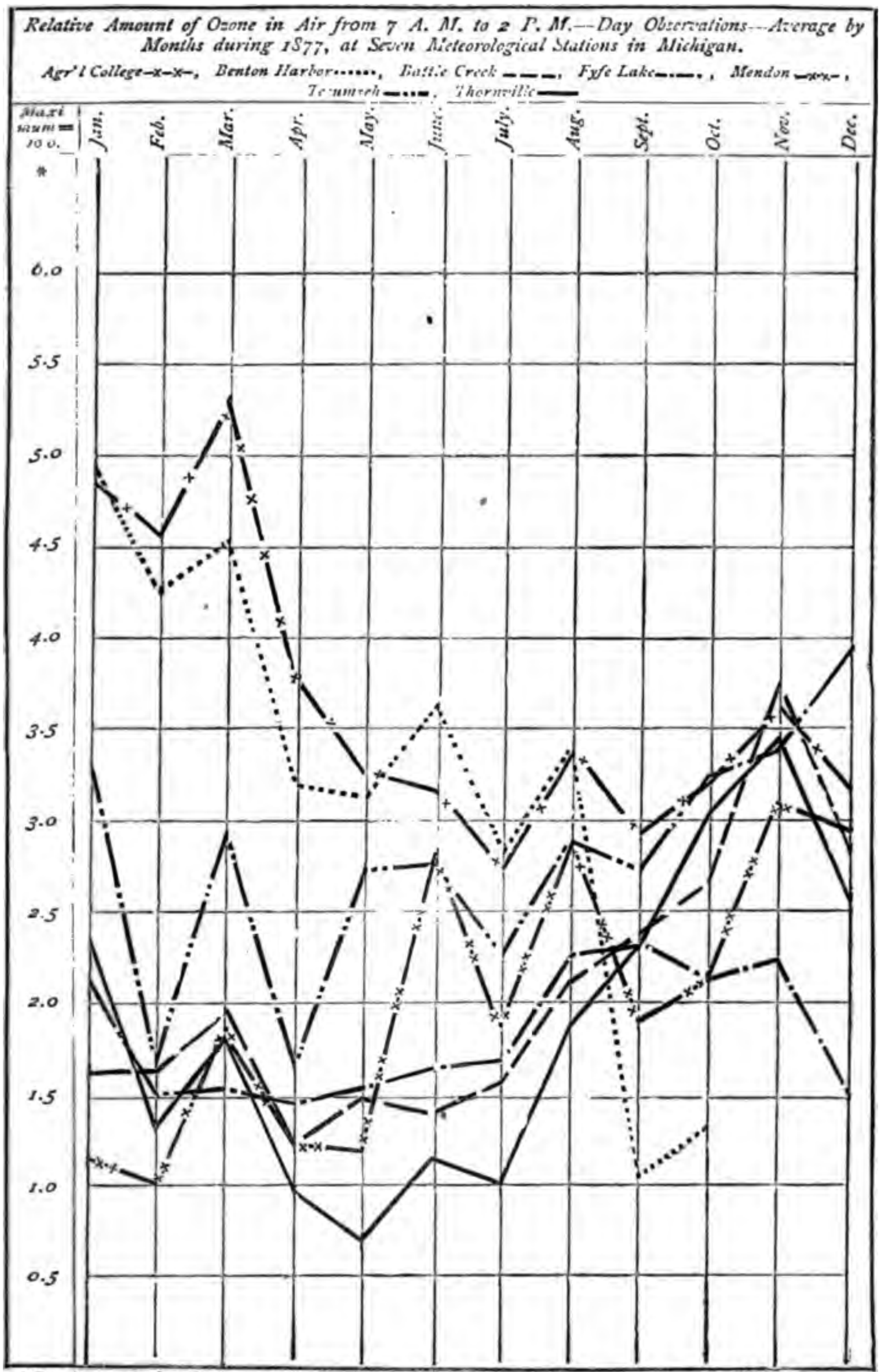
* The Names of Observers, their Places of Observation, and the County and Geographical Division of the State, in which these Places are situated, are given in Exhibit 7, page 215. † For full name of the division and for counties in each division, see Exhibit 1, page 113.

‡ This line is an average for only the stations for which statements are given for each month of the year.

§ The Average for the 10 months is 3.23. ‖ The average for the 10 months is 3.68.

Graphic representations of statements in seven lines of this table are given in Diagrams V. and VI., pages 241 and 243.

DIAGRAM No. V.—OZONE, DAY, 1877.



Relative Amount of Ozone in Air from 7 A. M. to 2 P. M.—Day Observations—Average by Months during 1877, at Seven Meteorological Stations in Michigan.

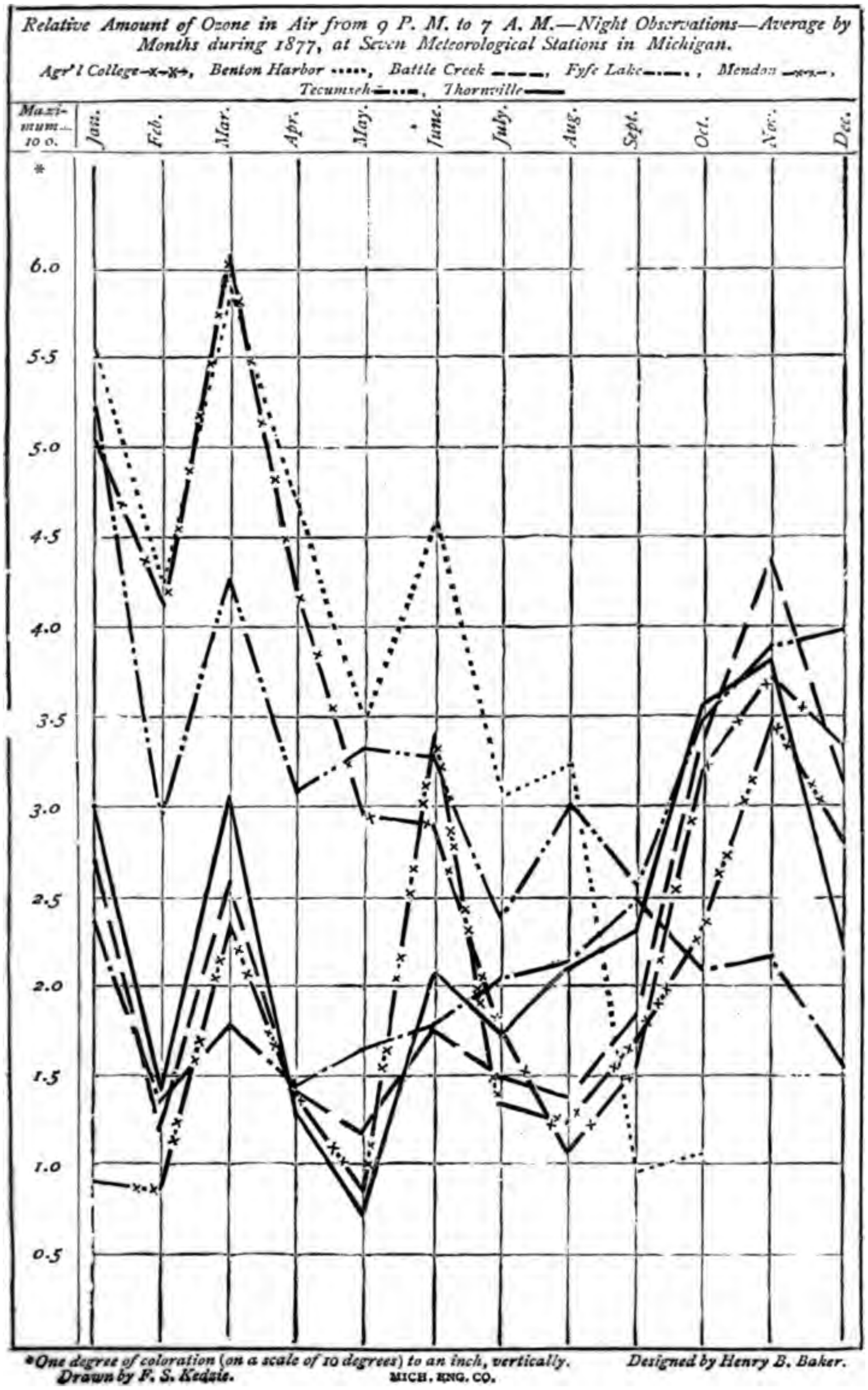
*One degree of coloration (on a scale of 10 degrees) to an inch, vertically.

Designed by Henry B. Baker.

Drawn by F. S. Kedzie.

MICH. ENG. CO.

DIAGRAM No. VI.—OZONE, NIGHT, 1877.



*One degree of coloration (on a scale of 10 degrees) to an inch, vertically. Designed by Henry B. Baker.
Drawn by F. S. Kedzie.

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TABLE XII.—*Comparison of the Average Amount of Atmospheric Ozone, as indicated by the Degree of Coloration* of Schönbein's Test-paper, during the Year and during each Month of the Year 1877, with the Average for the Five Years 1872–6; also Statement of the Average for each of the Five Years 1872–6,—Test-paper exposed from 7 A. M. to 2 P. M., for the Day Observation, and from 9 P. M. to 7 A. M., for the Night Observation. Compiled from records of observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

MONTHS.	DAY OBSERVATION,—7 A. M. TO 2 P. M.*								NIGHT OBSERVATION,—9 P. M. TO 7 A. M.*							
	1872.	1873.	1874.	1875.	1876.	For 5 Years, 1872–6.	1877.	In 1877 More (+), or Less (-), than Av. for 5 Yrs. 1872–6.	1872.	1873.	1874.	1875.	1876.	For 5 Years, 1872–6.	1877.	In 1877 More (+), or Less (-), than Av. for 5 Yrs. 1872–6.
ANNUAL AVERAGE	2.82	4.02	4.10	4.53	3.68	3.83	3.66	-0.17	4.24	4.72	3.99	5.04	4.11	4.42	3.33	-1.09
January	4.50	5.06	5.10	5.52	5.32	5.10	4.87	-0.23	5.44	6.32	6.39	5.93	6.90	6.20	5.03	-1.17
February	4.00	4.21	5.53	5.78	5.76	5.06	4.54	-0.52	6.00	5.93	6.10	6.57	7.27	6.37	4.14	-2.23
March	3.00	4.09	5.00	5.70	6.06	4.77	5.29	+0.52	5.71	5.80	6.00	6.19	7.00	6.14	6.06	-0.08
April	2.63	3.76	5.70	3.73	3.70	3.90	3.70	-0.20	5.30	4.27	6.60	3.96	5.53	5.13	4.27	-0.86
May	2.14	4.58	5.80	3.19	3.10	3.76	3.29	-0.47	3.84	5.59	4.90	4.03	4.13	4.50	2.94	-1.56
June	1.91	3.26	3.50	3.96	1.87	2.90	3.17	+0.27	3.23	2.66	2.34	3.66	2.27	2.83	2.90	+0.07
July	.88	3.59	1.80	3.52	2.16	2.39	2.71	+0.32	2.28	3.06	1.50	3.22	1.58	2.33	1.77	-0.56
August	.98	3.55	2.80	3.50	1.97	2.56	3.42	+0.86	.99	2.65	1.10	3.70	1.26	1.94	1.03	-0.91
September	1.40	2.30	2.90	4.30	2.60	2.70	2.93	+0.23	1.86	4.27	1.20	3.68	1.73	2.55	1.53	-1.02
October	1.93	4.52	3.32	5.30	3.45	3.70	3.20	-0.50	3.18	4.69	3.01	6.20	3.48	4.11	3.19	-0.92
November	4.00	4.30	3.80	4.90	3.57	4.23	3.60	-0.63	6.17	5.47	4.50	6.60	3.33	5.21	3.73	-1.48
December	5.81	4.97	4.00	5.00	4.57	4.87	3.17	-1.70	6.84	5.89	4.20	6.70	4.81	5.69	3.37	-2.32

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*According to a Scale of 10 Degrees of Coloration of Schönbein's test-paper.

OZONE.

The observations of ozone are taken by means of Schönbein's test-paper. A strip of the paper is exposed from 7 A. M. to 2 P. M. for the day observation, and from 9 P. M. to 7 A. M. for the night observation. The results are determined by comparing the test-paper, after exposure, with the ozone scale, and are recorded according to a scale of 10 degrees of coloration. A copy of the scale is printed on page 142 of the Third Annual Report, in connection with an address on Ozone, by Prof. R. C. Kedzie, the President of this Board, in which address diagrams are given representing observations of ozone at the State Agricultural College, for each of the years 1872–1876.

Table XI., page 240, states for the year 1877 and for each month of the year, the results of observations of ozone at 12 stations in the State, and also an average of observations at 10 stations. Diagrams V. and VI., pages 241 and 243, represent these results graphically for 7 of the stations. These diagrams may be studied in connection with Diagrams Nos. 1, 2, and 3, on pages following, relative to diseases in Michigan, in 1877. They may also be studied in connection with Exhibits 11, 12, 13, and 14, in the same article, wherein certain diseases are so tabulated as to facilitate the study of their relations to atmospheric ozone and to other meteorological conditions.

Table XII., page 245, compares the observations in 1877 at one central station with the average of observations for the five years from 1872 to 1876 inclusive, and also gives the monthly averages of observations for each of the years from 1872 to 1876.

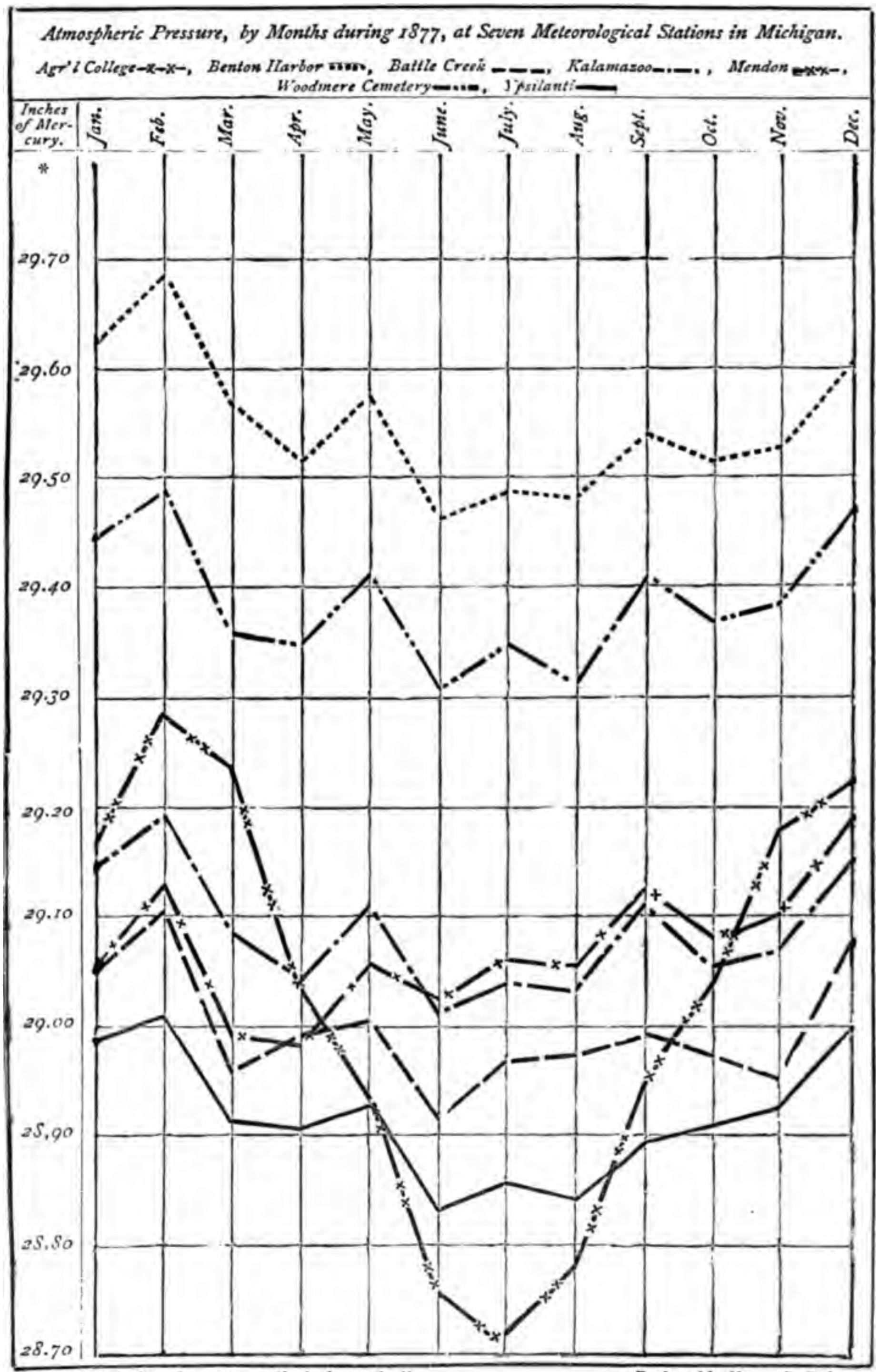
The amount of atmospheric ozone in 1877, both by the day and by the night observations, was less than the average for the five preceding years.

PRESSURE OF THE ATMOSPHERE.

Table XIII., page 249, states by months and for the year, the average atmospheric pressure in 1877 at each of seven stations in the State, and also the average for all the seven stations. These statements are graphically represented in Diagram VII., page 248.

Table XIV., page 250, compares, by statements for the year and for each month of the year, the average atmospheric pressure in 1877 with the average for the two years 1875 and 1876, and also states by months and year the average for each of the years 1875 and 1876. In every month of the year 1877, except April, the average atmospheric pressure at the Agricultural College was higher than the average for the corresponding months of the two preceding years. For the year 1877 it was .063 inches higher than the average for these two years.

DIAGRAM No. VII.—ATMOSPHERIC PRESSURE, 1877.



*Scale, .155 inches of mercury to the inch, vertically.
Drawn by F. S. Kedzie.

MICH. ENG. CO.

Designed by Henry B. Baker.

TABLE XIII.—*Average Atmospheric Pressure, by Months and Year 1877, at seven stations in Michigan, as Indicated by the Height, in Inches, of Mercury in the Barometer, Corrected for Temperature—Reduced to 32° F.,—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers for the State Board of Health.** (*Not Corrected for Instrumental Errors.*†)

STATIONS IN MICHIGAN.*	GEOGRAPHICAL DIVISION OF THE STATE.‡	YEAR 1877.	MONTHS, 1877.											
			Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
AVERAGE FOR 7 LOCALITIES	....	29.145	29.211	29.267	29.152	29.114	29.143	29.042	29.064	29.063	29.144	29.135	29.164	29.242
Agricultural College, near Lansing†	C.‡	29.066	29.057	29.124	28.981	28.971	29.056	29.021	29.062	29.046	29.121	29.077	29.100	29.178
Benton Harbor	S. W.	29.547	29.623	29.687	29.559	29.517	29.573	29.461	29.485	29.475	29.539	29.515	29.527	29.606
Battle Creek	S. C.	28.997	29.055	29.103	28.958	28.990	29.002	28.912	28.963	28.968	28.998	28.976	28.961	29.076
Kalamazoo	S. C.	29.086	29.150	29.193	29.074	29.037	29.106	29.010	29.039	29.031	29.108	29.062	29.072	29.150
Mendon	S. C.	29.019	29.166	29.279	29.229	29.030	28.930	28.753	28.707	28.771	28.941	29.033	29.174	29.220
Ypsilanti	S. C.	28.915	28.983	29.004	28.912	28.904	28.927	28.830	28.853	28.836	28.894	28.911	28.929	28.909
Woodmere Cemetery, near Detroit†	S. E.	29.386	29.442	29.481	29.353	29.348	29.409	29.309	29.342	29.316	29.409	29.369	29.388	29.467

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* The Names of Observers, their Places of Observation, and the County and Geographical Division of the State, in which these Places are situated are given in Exhibit 7, page 215.

† Error of the instrument at the Agricultural College, +.012; at Woodmere Cemetery, +.010. Errors of other instruments not ascertained.

‡ For full name of the division and for counties in each division, see Exhibit 1, page 113.

Graphic representations of statements in this table are given in Diagram VII., opposite this page.

TABLE XIV.—*Comparison of the Average Atmospheric Pressure during the Year and during each Month of the Year 1877, with the Average for corresponding periods of the Two Years 1875-6; also Statement of the Average for each of the Two Years 1875-6—Inches of Mercury in the Barometer, Corrected for Temperature.—Observations at 7 A. M., 2 P. M., and 9 P. M., Daily. Compiled from records of observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

MONTHS.	1875.	1876.	For Two Yrs., 1875-6.	1877.	In 1877 Higher (+), or Lower (-), than the Av. for Two Years, 1875-1876.
ANNUAL AVERAGE	28.999	29.007	29.003	29.066	+.063
January	29.005	29.073	29.039	29.057	+.018
February	28.875	29.063	28.969	29.124	+.155
March	28.844	28.929	28.887	28.981	+.094
April	29.047	29.000	29.024	28.971	-.053
May	29.061	29.009	29.035	29.056	+.021
June	29.029	28.911	28.970	29.021	+.051
July	29.044	29.009	29.027	29.062	+.035
August	29.025	29.048	29.037	29.046	+.009
September	29.031	28.955	28.993	29.121	+.128
October	29.016	28.929	28.973	29.077	+.104
November	29.054	28.953	29.004	29.100	+.096
December	28.955	29.203	29.079	29.178	+.099

Remarks on this table are given on page 246.

EFFECT ON THE HUMAN BODY OF GREAT CHANGES IN ATMOSPHERIC PRESSURE.

In the "General Remarks and Directions" on blank Meteorological Registers issued by the Smithsonian Institution, it is stated that "The change in the pressure of the atmosphere, in some extreme cases, amounts, to nearly a pound on every square inch of surface." Assuming that on the outer surface of the body there are 2,000 square inches of surface, in such a change of atmospheric pressure there would, then, be a change of nearly 2,000 pounds pressure on the surface of the body. In the lungs there are about 1,400 square feet of surface (Dalton's Physiology, page 218.) In the lungs, then, in such a change of atmospheric pressure, there would be a change in pressure amounting to nearly 201,600 pounds! In the lungs and on the surface of the body, then, there would be a change of pressure amounting to nearly 203,600 pounds, or nearly 101 tons; which increased pressure, in case of a rising barometer, it would seem must be in part sustained by increased labor of the heart and an increased tension of the large arteries, while the system is adapting itself to the change in atmospheric pressure: and during a falling barometer, also, when the change of atmospheric pressure is great, a considerable disturbance of the vascular and nervous systems must occur before they become perfectly adapted to the change. To conclude, as has been done, from a few experiments, that so great changes in atmospheric pressure do not exert any appreciable influence upon the human body, would seem to be making a hasty generalization. Certainly the influences which may be exerted on the human body by great changes in atmospheric pressure are very important, and should be carefully studied in connection with the various diseases.

WEEKLY REPORTS OF DISEASES
IN MICHIGAN

DURING THE

YEAR ENDING DECEMBER 29, 1877,

INCLUDING A

COMPILATION OF THE WEEKLY REPORTS FROM HEALTH OFFICERS OF CITIES AND
FROM REGULAR CORRESPONDENTS OF THE

STATE BOARD OF HEALTH

Compiled in the Office of the Secretary of the Board.

WEEKLY REPORTS OF DISEASES IN MICHIGAN DURING THE YEAR ENDING WITH DECEMBER, 1877.

In the Fourth Annual Report of this Board were given an outline of the proposed plan of securing and of compiling weekly reports of diseases, and two tables compiled from weekly reports for the month of September, 1876. In the Fifth Annual Report, the plan was further elucidated, as experience had shown to be necessary, and three tables were published for the fiscal year ending with September, 1877, similar to Tables 1, 2, and 3, on pages 258–259 and 262–289 of this Report.

The law requires that annual reports of State Officers or of State Boards shall be made as soon as practicable after the close of the fiscal year, September 30. If the Report of this Board is published before the first of January, any tables for a calendar year must be for one preceding the year in which the report is made. It has been thought best to publish the compilations of weekly reports for the calendar year, because all such compilations can best be studied for such periods, and because they can thus be best compared with other compilations, and especially with mortality reports and records of meteorological conditions, which are quite generally compiled by months and calendar years. Accordingly, in this article the tables are continued for the months of October, November, and December, 1877; and in order to a better understanding of the general subject and of the diagrams relating to the whole year 1877, Table 1 and so much of Table 2 as relates to the whole State are given for the full calendar year.

The blanks for the weekly reports upon which this compilation is based are printed on postal cards, which are supplied to such regular Correspondents of the Board as consent to make reports, and to the Health Officers of all cities for which a return of the name of a Health Officer has been received. Blank record books in which to preserve copies of the reports, together with comments, etc., are also supplied to these Observers of Diseases, to be retained by them. The reports are forwarded weekly to the Secretary of the Board, at Lansing.

As a statement of the method of making the reports, an extract from the "Printed Letter to Observers of Diseases, Stating Plan of Weekly Reports," is here printed. The letter was issued in October, 1877, in order to secure a better understanding of the proposed method of marking the reports than seemed to be attained by the directions printed on the postal blanks. The letter is printed in full on pages 240–243 of the Fifth Annual Report, for the year 1877. The following extract contains so much of it as relates to the method of marking the cards:

STATEMENT OF THE PLAN FOR MAKING WEEKLY REPORTS OF DISEASES.

1. In the column headed "Prevalence, Order," opposite the disease of which there is the greatest number of cases, write the figure 1; opposite that of which there is the

next greatest number of cases, write the figure 2; opposite that of which there is the next greatest number, write 3; and thus, according to the number of cases of each disease, apply consecutive numbers to all the diseases of which there have been cases in the locality during the week for which the report is made,—remembering, however, that two or more diseases of which there is the same number of cases should be marked with the same figure.

2. Write 0 opposite each disease mentioned of which there is no case.

3. If any disease not printed on the card has a greater number of cases, and is, therefore, higher in the "order of prevalence," than some other disease printed on the card, it should be written on the card with its proper number opposite; as should, also, any other important disease.

4. Between the lowest and the highest numbers used, no number should be omitted, though some numbers may be repeated.

5. All cases should be included, whether the patients were taken sick that week or previously, so long as they are actually sick with the given disease.

6. It seems best that the report be made according to the Observer's best knowledge of the diseases in his locality, without regard to who may have charge of the cases.

7. Some mark should be made opposite every disease mentioned. Two diseases should not be connected by a brace opposite one figure; to do this leads to confusion and inaccuracy in compiling the reports.

8. The numbers given in the "order of prevalence" column do not show whether a disease is more or less than "usually" prevalent, or more or less prevalent than during the preceding week.*

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* Other columns are provided for the statement of both these facts on the blank *Records* supplied to Observers, and whenever the Observers feel inclined to do the additional work involved, it will probably be best to provide for these statements on the reports. As to the use of these columns in the Records, a word may be stated here.

a. The column headed "Prevalence, Order," remains as formerly and as explained in this Printed Letter.

b. The column headed "Prevalence, Week," is designed to contain information whether the disease is increasing or decreasing in *number of cases*, and has no reference to the increase or decrease in its severity.

c. The column headed "Prevalence, Year," is designed to contain information whether there is a greater or a less number of cases than usual, or about the same number as in former years. This column has no reference to severity.

d. The column headed "Severity" is designed to include statements relative to the severity of the disease, compared with the experience in former years and in other places.

[In order to a better understanding of this part of the letter, by those not familiar with the Record book, a section of a page of the Record book, and the explanatory notes printed thereon, are here inserted:

a. Disease of greatest prevalence, 1; disease having next greatest number of cases, 2; and so on. Write 0 opposite diseases not prevalent. A blank space indicates that the item has been overlooked.

b. Compared with preceding week, the sign = indicates the same, + greater, — less, prevalence.

c. Compared with previous years, the sign = indicates the same, + indicates greater, — indicates less, prevalence.

d. The sign = indicates the usual severity, + indicates more, — indicates less, than the usual severity.

Please mail a copy of this to the Secretary of the State Board of Health, Lansing, Mich., as soon as convenient after close of week specified.

Diseases in..

....*during the week ending*

Saturday,....................................., *187* .....

	PREVALENCE.			SEVERITY.
	Order. a.	Week. b.	Year. c.	d.
Bronchitis..............................	......	......	......	....
Cerebro-spinal Meningitis..........	......	......	......	....
Cholera Infantum....................	......	......	......	....

]

9. A disease that one week was "5" or lower in the order, might be marked "1" the next week, and yet there be fewer cases of the disease the last week; because other diseases had decreased more rapidly or had disappeared altogether.

10. The numbers in the "order of prevalence" column have reference only to the relative number of cases, and have nothing to do with the severity, malignancy, importance, or fatality of a disease. Yet they do not *state* the number of cases; they show simply of what disease there were the *most* cases during the week for which the report is made, of what disease the *next highest* number, and so on.

11. If the correspondent prefers to report the number of cases, there is no objection to his doing so; provided that his method of reporting is clearly shown on every card by writing, on the right-hand *margin* of the card, the figures which denote the number of cases in his locality, "according to his best knowledge," and writing over them the word "cases." When the number of cases is very small or very large, the exact number might be a fact of considerable interest, and well worth stating on the margin of the card, even if not generally reported.

12. The following shows the correct marking in the "order of prevalence" column, when the number of cases is as given on the margin of the card:

Diseases in .... during the week ending

Saturday, ..., 187...

	Prevalence. Order. See a.	Severity. See b.	*Cases.*
Bronchitis..........................	4	+	6
Cerebro-spinal Meningitis......	0	....	0
Cholera Infantum..................	0	....	0
Cholera Morbus.....................	0	....	0
Consumption, Pulmonary.......	6	=	4
Croup, Membraneous............	0	....	0
Diphtheria	0	....	0
Diarrhea................................	0	....	0
Dysentery	9	—	1
Erysipelas.............................	9	+	1
Fever, Intermittent................	2	—	10
Fever, Remittent...................	8	=	2
Fever, Typhoid (Enteric).......	7	=	3
Fever, Typho-malarial...........	0	....	0
Influenza	3	=	8
Measles	0	....	0
Pneumonia............................	9	+	1
Puerperal Fever.....................	0	....	0
Rheumatism	9	—	1
Scarlatina..............................	0	....	0
Small-pox..............................	0	....	0
Whooping-cough	1	+	14
....	....	....	
Rotheln (German Measles).......	5	=	5
Croup, Spasmodic..................	9	+	1
Puerperal Mania...................	8	=	2

a. Disease of greatest prevalence, 1; disease having next greatest number of cases, 2; and so on. Write 0 opposite diseases not prevalent. A blank indicates that the item has been overlooked.
b. The sign = indicates the usual severity, + indicates more, — less than the usual severity.
Please mail this, signed and dated, as soon as convenient after close of week specified.

...., *M. D.*

13. In the column headed "Severity," the sign "=" denotes that the disease is of the usual severity; the sign "+" denotes more, and the sign "—" less than the usual

severity, compared with former years and other places. It is desirable that this column be filled.

14. In order that reports lost through the mails may be replaced, it is desirable that correspondents make and preserve a record of diseases. That this may be done is one object in supplying the record books.

The question of the practicability and success of the method here given of registration of diseases involves two considerations; viz., the accuracy and completeness of the weekly reports, and the skill with which the reports are combined and the results presented for study. A diversity of diagnosis is incidental to all systems of registering sickness and deaths. It is believed that with the observers engaged in this registration, the error from incorrect diagnosis is reduced to a minimum, and that enough observers have been secured so that this error does not seriously vitiate the tabular results. It is also believed that while an observer may not be able at all times to state the exact amount of sickness in his locality, he may in most cases give an approximate statement of the order of prevalence of the diseases reported,—and that in a compilation of a sufficient number of such approximate statements, errors of observation will be nearly eliminated.

Concerning the completeness of the reports, it may be said that in addition to the 22 diseases printed on the postal blank, concerning which a statement is thus expressly asked, blank spaces are left on the card, in which observers are requested to enter the names of other important diseases occurring in the localities for which they report. Two or three communications on this point have been received which seem worthy of a general notice. One correspondent wrote: "I have about as many cases that I cannot set opposite the names on the postal blank as of those I can." Another wrote: "I am sure that there has been a great deal of sickness that I have not reported; but much of it is of a kind not included in your printed list of diseases." Another wrote: "Frequently there is not a real typical case of anything named on the postal list. There is always one or more who has slight symptoms that come under the card list, but often not worth mentioning." The card has blank lines for diseases not in the printed list, and the Printed Letter Stating Plan expressly asks that important diseases not in this list be reported. The diseases in the list were selected with reference to their supposed relation to observable conditions, or to other diseases which it was desirable to study; but suggestions for the addition of other diseases would at any time be gladly received and duly considered.

Since the reports began, five diseases,—consumption, remittent fever, typho-malarial fever, neuralgia, and tonsilitis, have been added to the printed list, making the number now on the card 24. Yet there will be sickness not reported, and there will sometimes be sickness which it is difficult to classify, but this may usually be named from its predominant characters.

Concerning the combination of the weekly reports, something was said in the last annual Report. An attempt has been made to exhibit for the diseases tabulated the distribution as regards area, time, and severity, and also as regards the relative amount of sickness from each. For a statement of the method of compilation, the reader is referred to the foot-notes to Tables 2 and 3, pages 263 and 279. As regards the first three columns of figures in Table 2, the heads and accompanying foot-notes are, perhaps, sufficiently explanatory. Concerning the fourth column, "Average Order of Prevalence where Prevalent," it may be remarked that it does not give the actual order of prevalence, but it is an attempt to indicate something as to that order in addition to what is given in the three preceding columns. It has not seemed practicable to secure weekly statements of the number of cases of each disease in localities represented, or of the ratio of number of cases to the population of the localities. What has been done is this: The weekly card reports are marked by the observers to show the order of prevalence of diseases reported for each locality,—the disease of which there are the most cases being marked 1; that of which there is the next greater number (whether the difference be small or great) being marked 2; and so on, using the consecutive figures 3, 4, 5, 6, etc., for all diseases reported, diseases on the printed list of which there are no cases being marked 0. The cards from each observer are compiled by months, the sum of the numbers denoting the order of prevalence of each disease being divided by the number of weeks in the month that the disease was reported present, for an Average Order of Prevalence, which is stated by columns in Table 3. This average order for the month may differ from the true order of prevalence of the several diseases for the month, and hence does not indicate certainly the relative number of cases of these diseases; for there might have been more cases of a disease whose order of prevalence, in a month of four weeks, had been denoted by the numbers, 2–2–1–2, of which the average would be 2, than of a disease whose order of prevalence for the same time and locality had been denoted by the numbers, 1–1–2–1, of which the average would be 1. Yet in many cases the averages of the order of prevalence of the several diseases would, taken in order, indicate the actual order of prevalence or the relative number of cases of the several diseases tabulated; and from a study of these averages for several localities, as given in Table 3, some comparison may be made of the sickness in one locality with that of another. But in making this comparison it must be remembered that the numbers do not refer to an absolute scale applicable to all localities and to different months or weeks. It is not probable that at any given locality the sickness from all diseases increases or decreases uniformly; hence it is possible by comparison of statements of the order of prevalence of the different diseases for consecutive short periods of time to determine, in many cases, the time of unusual prevalence of any disease. Again it is not probable that the order of prevalence of diseases is often precisely the same for all the localities of the State, or that the changes in this order in any week are precisely the same for all localities. Hence, it is possible by comparison of statements of the order of prevalence of the diseases at different localities for simultaneous periods of time, to determine, often, the places of unusual prevalence of any disease. Especially is this true of those diseases which vary greatly, from time to time, in number of cases. What is true, in this respect, of the weekly statements of order of prevalence is to a degree true of the monthly averages of these statements.

In Table 2 is given, for each disease, the average of the numbers in the order of prevalence column of Table 3 for every observer in the Division or in the State, as the case may be, who reported that disease present during the month. Because a much greater number of diseases may be present in one locality than in another, and because there may be considerable variation in the order at different localities, it is possible for greater variations from the true order of prevalence to occur in Table 2 than in Table 3. It is, however, believed that by the combination of many reports, marked on a uniform plan, the errors which have been spoken of, and which would vitiate a compilation of a few reports, are largely eliminated, so that the numbers in the "order of prevalence" column, taken in numerical order really give an indication of the order of prevalence or the relative number of cases of the several diseases.

HIBIT 10.—*Giving, by Months of the Year ending December 29, 1877, for the State, and for each of the Ten Geographical Divisions of Michi- m from which Weekly Reports of Diseases were received, the Number of Observers from whom the reports were received; the Number of eports received; the Day on which, for the purposes of this Compilation, each Month is made to end; and the Number of Weeks thus included n each Month.*

MONTHS, 1877.	MONTHS END SATURDAY.	Number of Weeks.	STATE.		DIVISIONS OF THE STATE.* 1. UPPER-PENINSULAR.		2. NORTT-WESTERN.		4. NORTH-EASTERN.		5. WESTERN.		6. CENTRAL.		7. NORTHERN-CENTRAL.		8. BAY AND EASTERN.		9. SOUTH-WESTERN.		10. SOUTHERN-CENTRAL.		11. SOUTH-EASTERN.	
			Observers.‡	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Ovservers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†
Year	Dec. 29	52	115	3,320	5	114	2	47	3	65	12	287	22	642	1	11	18	468	12	344	23	729	18	614
Av. per Month	....	..	66	277	2	10	1	5	1	5	6	24	13	54	1	4	9	39	7	29	15	61	12	51
Jan.	Feb. 3	5	67	325	3	15	2	10	2	8	7	34	15	71	......	....	7	35	6	30	14	67	11	55
Feb.	March 3	4	71	273	3	12	1	4	2	8	9	33	14	53	......	....	9	34	7	27	14	54	12	48
March	March 31	4	68	267	3	12	1	4	2	8	9	36	13	52	......	....	7	28	7	26	14	53	12	48
April	April 28	4	64	244	3	12	1	3	2	6	7	28	11	41	......	....	8	31	7	26	13	50	12	47
May	June 2	5	60	289	3	11	1	5	1	5	6	27	11	55	......	....	7	35	6	28	13	65	12	58
June	June 30	4	57	222	1	4	1	4	1	4	5	20	11	44	......	....	7	28	6	22	15	56	10	40
July	July 28	4	55	215	2	8	1	4	1	4	5	20	11	44	......	....	7	26	5	19	13	50	10	40
Aug.	Sept. 1	5	56	272	2	8	1	5	1	5	5	23	11	55	......	....	6	30	7	33	12	58	11	55
Sept.	Sept. 29	4	60	232	2	7	1	4	1	4	5	20	12	47	......	....	9	32	6	22	13	52	11	44
Oct.	Nov. 3	5	82	386	1	5	1	4	1	5	5	22	15	68	1	4	16	75	9	43	19	93	14	67
Nov.	Dec. 1	4	76	300	2	8	......	......	1	4	3	12	14	56	1	3	15	59	9	36	17	66	14	56
Dec.	Dec. 29	4	78	295	3	12	......	......	1	4	3	12	14	56	1	4	14	55	9	32	17	65	16	56

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* For counties in each Division, see Exhibit 1, page 113.

† Reports were not received from all of the Observers, for every week, so that the number of reports received does not equal the number of Observers multiplied by the number of weeks in the given month or in the year.

‡ In some localities there were more Observers than one; and two Observers having changed their residence during the year, each reported from two localities. The whole number of localities from which reports were received was 85; the average number per month was 58.

months, of the per cent of weekly reports stating presence of each of the diseases here tabulated; and in connection with Tables 2 and 3, pages 262–289, which contain additional statements relative to each of these twenty-two diseases. The method by which statements in this table were obtained is stated in foot-notes to Tables 2 and 3, pages 263 and 279.

Table 1 should also be studied in connection with Diagrams I., II., III., IV., V., VI., and VII., pages 221, 230, 233, 237, 241, 243, 248, wherein statements of many of the meteorological conditions in Michigan in 1877, are graphically represented.

Exhibit 10, page 260, gives a general idea of the distribution of the observers of diseases throughout the State, and also of the number of observers reporting in different parts of the State in each month of the year. It states for each of the ten geographical divisions of the State from which weekly reports were received during the year, and also for the whole State, the number of observers from whom reports were received for each month of the year, and for the year 1877, and also the number of weekly reports received. A statement of the counties included in each of these divisions is given in Exhibit 1, page 113. The localities for which reports were received for each month of the year are stated in the first column of Table 3, on pages 308–343 of the Fifth Annual Report, for the first nine months of the year; and on pages 278–289 of this Report, for the months of October, November, and December, 1877.

Table 2, pages 262–277, gives for the State and for each of the geographical divisions of the State from which weekly reports have been received, a summary, for the year and for each month of the year 1877, of statements tabulated in Table 3,—for the first nine months of the year, on pages 308–343 of the Fifth Annual Report; and for the months of October, November, and December, 1877, on pages 278–289 of this Report. In stating the per cent of observers who reported a disease present, the first column in Table 2 indicates, approximately, the area of prevalence of the disease. The second column of table 2 states the average per cent of weeks the disease was reported present, in the State or in the division, for each month of the year. The third column of Table 2 combines the statements of the two preceding columns in such a way as to give an idea of the *time* of prevalence of each disease, and the *area* of its prevalence combined. In addition to statements in the foot-notes to Tables 2 and 3, pages 263 and 279, relative to the "order of prevalence" column of these tables, remarks on the significance and use of this column are given on pages 251–253 of the Fifth Annual Report, and on pages 256–257 of this Report. The last four columns of Table 2, which relate to the severity of the diseases, were compiled directly from the weekly-report cards. It will be seen that statements relative to the severity of diseases reported are not made by all observers for all diseases reported. When more complete statements are made on this important point, valuable comparisons will be possible indicating the relation between the severity of diseases tabulated, and observed meteorological conditions. Diagrams 1, 2, and 3, on following pages, give graphic representations, by months, of statements in Table 2, relative to the per cent of weekly reports stating presence of each of the twenty-two diseases tabulated.

Table 3, pages 278–289, has been compiled directly from the card reports. It gives a general idea of the diseases present each month in the localities represented. These localities are arranged alphabetically within the geographical divisions of the State from which the reports summarized were received. For want of room on the same pages with the tables, some of the side-notes, containing statements by observers in different localities, relative to diseases reported, are printed on the page immediately following the table.

TABLE 2.—*Exhibiting for the Year, and for each Month of the Year, ending Saturday, December 29, 1877, a Summary relative to Diseases in the State of Michigan, indicating the Prevalence as regards both Time and Area, and also the Comparative Severity of the Diseases.*

NO. OF OBSERVERS, NO. OF REPORTS, ETC.	DISEASES.	Per Cent of Observers Reporting Prevalence of.[b]	Av. Per Cent of Weeks Reported Prevalent **where** Prevalent.[c]	Per Cent of Reports Stating Prevalence of.[d]	Av. Order of Prevalence **where** Prevalent.[e]	Times Reported **More** than usually Severe.	Times Reported **Usually** Severe.	Times Reported **Less** than usually Severe.	Difference between "Times Reported More" and "Times Reported Less" than usually Severe.[f]	Av. Times per Month Reported **More** than usually Severe.	Av. Times per Month Reported **Usually** Severe.	Av. Times per Month Reported **Less** than usually Severe.	Av. Difference between "Times More" and "Times Less" Severe.[f]
	Average for Tabulated Diseases Reported Prevalent	38	71	28	4.1	60.4	528.7	201.2	-140.8	5.0	44.1	16.8	-11.7
FOR THE YEAR ENDING DECEMBER 29, 1877. Whole No. of Localities represented, 85; Av. No. of Localities represented per month, 58; Whole No. of Observers during the year, 115; Av. No. of Observers per month, 66; Total No. of Reports, 3,320[a]; Av. No. of Reports per month, 277.	Bronchitis	71	78	55	2.3	110	1158	359	-249	9.2	96.5	20.9	-20.8
	Cerebro-spinal Meningitis	6	46	3	6.0	18	36	27	-9	1.5	3.0	2.3	-0.8
	Cholera Infantum	17	60	11	4.9	33	188	92	-59	3.0	17.1	8.4	-5.4
	Cholera Morbus	26	54	15	4.7	32	271	120	-88	2.7	22.6	10.0	-7.3
	Consumption, Pulmonary	61	83	52	5.1	98	1250	68	+30	8.2	104.2	5.7	+2.5
	Croup, Membraneous	14	44	6	6.1	19	137	38	-19	1.6	11.4	3.2	-1.6
	Diphtheria	32	59	19	5.3	64	236	254	-190	5.3	19.7	21.2	-15.8
	Diarrhea	58	69	41	3.8	61	796	329	-268	5.1	66.3	27.4	-22.3
	Dysentery	34	61	21	4.9	42	341	226	-184	3.5	28.4	18.8	-15.3
	Erysipelas	35	57	20	5.8	37	335	186	-149	3.1	27.9	15.5	-12.4
	Fever, Intermittent	85	89	75	2.2	147	1574	445	-298	12.3	131.2	37.1	-24.8
	Fever, Remittent	68	76	52	3.1	106	1068	321	-215	8.8	89.0	26.8	-17.9
	Fever, Typhoid (Enteric)	22	62	14	5.5	45	214	129	-84	3.8	17.8	10.8	-7.0
	Fever, Typho-malarial	37	69	26	4.7	81	454	196	-115	6.8	37.8	16.3	-9.6
	Influenza	54	75	41	3.0	146	781	284	-138	12.2	65.1	23.7	-11.5
	Measles	12	62	7	5.0	3	155	58	-55	0.3	12.9	4.8	-4.6
	Pneumonia	56	72	40	4.0	97	739	305	-208	8.1	61.6	25.4	-17.3
	Puerperal Fever	10	38	4	6.1	18	64	28	-10	1.5	5.3	2.3	-0.8

	Rheumatism	78	78	60	4.0	86	1186	440	-354	7.2	98.8	36.7	-29.5
	Scarlatina	33	64	21	4.8	36	237	313	-277	3.0	19.8	26.1	-23.1
	Small-pox	5	72	4	6.8	9	59	30	-21	0.8	5.4	2.7	-1.9
	Whooping-cough	28	71	21	4.8	40	352	178	-138	3.3	29.3	14.8	-11.5

[a] Not every one of the Observers sent in a report for every week, so that the number of reports received does not equal the number of Observers multiplied by the number of weeks.

[b] Indicates the Area of Prevalence, except that in a few instances there were two or more Observers in one city or village.

[c] This column gives the per cent which the number of reports stating prevalence of a disease is of the number of card-reports *received* from such of the Observers as reported the disease present. In the line "Av. for Tabulated Diseases," it gives the per cent which the number of times *all* diseases are reported present is of the number of times they *might have been* so reported on the cards received, for the time specified, from the Observers who reported the diseases present at all. It will be seen that this is a more accurate average than would be obtained by dividing the sum of the column by the number of diseases reported present.

[d] This column gives the per cent which the number of reports stating presence of a disease is of the whole number of reports received from *all Observers* in the State or Division, as the case may be. It combines and states, in a general way, an idea of the *time* a disease was prevalent, with an idea of the *area* of its prevalence. Had every Observer sent a report every week of the month or year, the numbers in this column would be the product of the numbers in the same line in the two preceding columns.

[e] The disease having the greatest number of cases was to be marked 1 in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals (for the State or for the Division) of the Order of Prevalence columns, in Table 3, by the number of men who reported the disease prevalent. The "Av. for Tabulated Diseases" is found by dividing the sum of the totals in the Order of Prevalence columns, in Table 3, for all diseases reported prevalent, by the sum of the numbers of men who reported the different diseases prevalent, thus counting each man once for every disease he reported prevalent.

[f] The + sign indicates that the times reported "more" exceed those reported "less" than usually severe; the - sign, that the times reported "less" exceed those reported "more" than usually severe, the number "more" or "less" being indicated by the figures.

This table was compiled from Table 3,—on pages 278–289 of this volume, for October, November, and December, 1877; and, for the first nine months of the same year, on pages 308–343 of the Fifth Annual Report. In compiling it, a fraction less than one-half was rejected; a fraction equal to or greater than one-half was counted as one. For other comments on this table, see pages 256–257, and 261; see also pages 251–253 of the preceding (Fifth) Annual Report. For statement of the plan of marking the card-reports, see pages 253–256. An article on the Principal Meteorological Conditions in Michigan in 1877, illustrated with graphic representations of the leading conditions, by months, is given on pages 211–250. Graphic representations, by months, of statements in the fifth column of the four next succeeding pages of this table are given in Diagrams 1, 2, and 3, on pages following.

TABLE 2.—*Continued.—Diseases in the State,—In January, February, March, April, May, and June, 1877.*

MONTHS.	DISEASES.	Per ct. of Observers Rep't'g Prev'ce of. *b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev. *a, c*	Per ct. of Reports Stating Prev'ce of. *d*	Av. Order of Prevalence **where** Prev. *e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd **Usually Severe.**	Times Rep't'd **Less** than usually Severe.	Difference between Times "**More**" and "**Less**" Severe. *f*	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of. *b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev. *a, c*	Per ct. of Reports stating Prev'ce of. *d*	Av. Order of Prevalence **where** Prev. *e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd **Usually Severe.**	Times Rep't'd **Less** than usually Severe.	Difference between Times "**More**" and "**Less**" Severe. *f*	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of. *b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev. *a, c*	Per ct. of Reports Stating Prev'ce of. *d*	Av. Order of Prevalence **where** Prev. *e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd **Usually Severe.**	Times Rep't'd **Less** than usually Severe.	Difference between times "**More**" and "**Less**" Severe. *f*
JANUARY.*	Av. for Tabulated Diseases Reported Prevalent.	40	68	27	4.1	6.5	49.6	19.7	-13.2	FEBRUARY.*	38	73	28	4	4.8	42.7	15.6	-10.9	MARCH.*	36	71	26	4	5.9	35.8	15.6	-9.7
	Bronchitis	85	90	76	2	16	176	34	-18		89	82	72	2	16	128	26	-10		90	80	72	2	22	115	29	-7
	Cerebro-spinal Meningitis	3	50	2	8	0	1	4	-4		8	46	4	7	1	4	3	-2		6	44	3	5	1	3	0	+1
	Cholera Infantum	3	20	1	2	0	1	1	-1		0	0	0	0	0	0	0	0		1	50	1	4	0	0	2	-2
	Cholera Morbus	10	30	3	5	2	4	3	-1		3	25	1	4	0	1	0	0		6	38	2	3	0	0	5	-5
	Consumption, Pulmonary	66	77	50	5	11	109	12	-1		52	91	47	5	4	87	7	-3		59	80	47	5	11	90	6	-5
	Croup, Membraneous	33	31	14	5	6	28	6	0		21	49	10	5	1	20	5	-4		22	41	9	6	0	13	9	-9
	Diphtheria	51	65	33	4	14	37	42	-28		38	62	24	5	4	19	28	-24		35	56	19	6	2	19	18	-16
	Diarrhea	43	55	24	5	3	33	32	-29		38	50	21	5	1	29	20	-19		37	56	21	5	2	24	27	-25
	Dysentery	12	63	7	8	2	7	13	-11		13	61	8	7	0	11	7	-7		12	53	6	8	1	4	8	-7
	Erysipelas	49	52	25	5	5	46	24	-19		41	68	28	6	5	43	16	-11		40	62	25	6	3	36	13	-10
	Fever, Intermittent	69	69	47	4	9	89	33	-24		69	75	52	3	8	90	27	-19		71	81	57	3	5	86	35	-30
	Fever, Remittent	52	56	30	4	4	54	26	-22		51	67	33	4	4	52	23	-19		59	64	39	4	6	49	32	-26
	Fever, Typhoid (Enteric)	21	64	14	6	0	29	16	-16		15	40	7	5	1	5	10	-9		9	42	4	8	0	3	6	-6
	Fever, Typho-malarial	24	62	14	6	4	22	8	-4		18	67	12	6	0	15	12	-12		21	64	13	6	3	14	14	-11
	Influenza	73	77	56	3	28	106	30	-2		76	86	65	2	25	116	17	+8		72	84	60	2	39	78	21	+18
	Measles	12	55	6	5	0	14	0	0		10	58	5	6	3	7	2	+1		16	57	9	6	0	11	9	-9
	Pneumonia	88	80	70	3	21	134	38	-17		86	78	67	3	8	107	37	-29		81	78	63	3	18	86	30	-12
	Puerperal Fever	16	26	4	7	1	3	5	-4		7	50	4	6	0	8	2	-2		19	35	7	6	3	12	3	0
	Rheumatism	82	83	68	4	8	125	47	-39		86	79	68	4	7	101	40	-33		79	79	64	4	10	93	34	-24
	Scarlatina	43	64	28	5	1	32	37	-36		38	69	26	4	4	25	25	-21		34	64	22	5	4	17	24	-20

	Small-pox	10	62	6	5	2	9	3	-1		6	80	4	8	1	5	3	-2		4	100	4	7	0	9	1	-1
	Whooping-cough	34	66	23	6	6	32	19	-13		32	77	25	4	7	23	18	-11		29	68	20	4	0	25	17	-17
April.*	Av. for Tabulated Diseases Reported Prevalent.	36	71	24	4	4.7	31.7	13.3	-8.5	May.*	38	65	24	3.9	3.8	40.0	14.7	-10.9	June.*	34	69	23	3.8	2.8	30.5	12.5	-9.7
	Bronchitis	80	81	65	3	5	103	27	-22		70	63	45	3	3	71	35	-32		46	68	31	4	0	36	24	-24
	Cerebro-spinal Meningitis	6	50	3	6	0	3	2	-2		7	42	3	5	0	6	0	0		11	45	5	6	5	2	0	+5
	Cholera Infantum	3	63	2	6	0	0	4	-4		7	30	2	8	0	0	4	-4		26	42	11	5	0	13	9	-9
	Cholera Morbus	9	38	4	4	0	1	4	-4		23	30	7	5	1	8	9	-8		32	46	14	5	1	16	11	-10
	Consumption, Pulmonary	63	83	53	5	16	80	3	+13		63	75	49	5	16	98	5	+11		61	82	50	4	6	88	1	+5
	Croup, Membraneous	13	39	5	7	1	9	2	-1		8	56	5	7	0	11	1	-1		5	50	3	10	1	5	0	+1
	Diphtheria	31	53	16	6	3	12	19	-16		15	53	8	5	1	10	9	-8		18	55	10	5	0	8	13	-13
	Diarrhea	33	61	20	5	3	24	14	-11		53	51	27	4	4	42	20	-16		56	61	35	3	2	56	14	-12
	Dysentery	16	48	8	7	0	5	8	-8		23	43	10	6	1	9	12	-11		28	47	14	5	0	15	11	-11
	Erysipelas	50	64	32	6	6	46	10	-4		50	51	25	5	4	33	25	-21		33	60	19	5	3	22	13	-10
	Fever, Intermittent	81	86	70	2	6	88	44	-38		93	89	85	2	14	155	35	-21		96	93	90	1	8	139	28	-20
	Fever, Remittent	58	65	39	4	5	50	23	-18		72	71	49	3	3	88	19	-16		67	71	47	2	4	68	21	-17
	Fever, Typhoid (Enteric)	16	49	8	7	2	5	6	-4		13	46	6	4	6	3	5	+1		11	68	7	6	3	5	7	-4
	Fever, Typho-malarial	19	60	11	6	3	8	9	-6		20	60	12	5	3	18	8	-5		21	71	15	5	4	18	6	-2
	Influenza	59	84	50	2	20	58	20	0		57	59	33	3		54	29	-27		33	81	27	3	2	30	24	-22
	Measles	22	62	14	5	0	21	8	-8		27	73	19	4	0	38	11	-11		19	69	13	4	0	15	13	-13
	Pneumonia	72	75	55	3	13	62	29	-16		57	68	38	4	7	62	24	-17		32	70	23	4	7	22	14	-7
	Puerperal Fever	11	37	4	5	2	5	2	0		10	48	4	6	6	6	1	+5		9	65	6	5	3	4	2	+1
	Rheumatism	75	80	61	4	13	69	33	-20		83	76	60	4	12	91	32	-20		70	69	48	4	4	64	27	-23
	Scarlatina	38	63	24	5	3	24	17	-14		33	65	21	4	1	20	23	-22		37	50	18	4	0	13	22	-22
	Small-pox	8	79	6	5	1	6	1	0		10	62	6	5	0	7	4	-4		5	92	5	4	2	3	2	0
	Whooping-cough	23	75	18	5	2	19	7	-5		33	67	22	4	0	42	12	-12		32	73	23	4	7	28	14	-7

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 262. * For Number of Observers, Reports, Weeks in each Month, etc., see first five columns in Exhibit 10, page 260. Graphic representations of statements of diseases by months, are given in three diagrams on pages following.

TABLE 2.—*Continued.—Diseases in the State,—In July, August, September, October, November, and December, 1877.*

MONTHS	DISEASES.	Per ct. of Observers Rep't'g Prev'ce of. b	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c	Per ct. of Reports Stating Prev'ce of. d	Av. Order of Prevalence where Prev. e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe. f	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of. b	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c.	Per ct. of Reports Stating Prev'ce of. d	Av. Order of Prevalence where Prev. e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe	Difference between Times "More" and "Less" Severe. f	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of. b	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c	Per ct. of Reports Stating Prev'ce of. d	Av. Order of Prevalence where Prev. e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe. f
	Av. For Tabulated Diseases Reported Prevalent.	36	73	26	4.1	3.0	33.9	12.3	-9.3		40	73	29	4.2	6.0	47.6	15.6	-9.6		40	76	31	4.4	5.0	42.6	13.7	-8.7
JULY.*	Bronchitis	37	69	25	5	0	25	21	-21	AUGUST.*	34	63	22	5	1	33	22	-21	SEPTEMBER.*	48	77	37	5	7	50	19	-12
	Cerebro-spinal Meningitis	2	100	2	5	2	0	2	0		5	20	1	5	1	1	0	+1		7	31	2	7	0	3	3	-3
	Cholera Infantum	38	63	24	4	4	33	11	-7		63	75	46	4	19	73	19	0		45	70	31	5	5	35	20	-15
	Cholera Morbus	67	73	49	4	7	51	25	-18		77	67	51	4	10	98	19	-9		58	59	34	5	5	52	18	-13
	Consumption, Pulmonary	53	81	43	5	4	75	7	-3		41	84	35	6	2	79	3	-1		42	89	38	6	4	72	1	+3
	Croup, Membraneous	2	100	2	18	1	3	1	0		5	43	2	10	0	5	1	-1		10	33	3	7	1	3	2	-1
	Diphtheria	18	53	10	7	2	9	9	-7		14	50	7	6	1	11	8	-7		22	54	12	6	4	14	7	-3
	Diarrhea	89	82	73	3	3	117	12	-9		96	89	86	2	22	157	24	-2		97	84	81	8	7	117	37	-30
	Dysentery	55	60	33	4	4	41	17	-13		91	79	72	3	20	104	44	-24		82	75	61	4	9	79	34	-25
	Erysipelas	25	59	15	5	1	13	18	-17		23	48	11	6	2	9	14	-12		18	55	9	8	0	10	11	-11
	Fever, Intermittent	93	96	90	2	11	129	23	-12		95	95	90	2	21	162	26	-5		93	95	89	2	19	142	15	+4
	Fever, Remittent	69	71	50	3	4	71	17	-13		82	82	68	3	13	120	26	-13		80	91	72	3	16	121	10	+6
	Fever, Typhoid (Enteric)	7	63	5	6	0	5	5	-5		25	53	13	6	3	17	8	-5		38	67	25	5	8	21	12	-4
	Fever, Typho-malarial	31	71	22	6	2	26	10	-8		43	65	27	5	4	35	18	-14		63	79	49	4	18	61	18	0
	Influenza	35	75	26	4	2	23	24	-22		27	53	15	5	0	22	13	-13		35	71	25	5	1	81	18	-17
	Measles	16	53	9	5	0	12	5	-5		11	43	5	6	0	4	6	-6		5	50	8	6	0	5	1	-1
	Pneumonia	24	62	15	6	3	14	12	-9		23	60	14	7	1	16	16	-15		25	61	15	7	0	18	13	-13
	Puerperal Fever	2	50	1	5	0	0	0	0		7	25	2	5	0	4	0	0		7	36	2	6	0	4	1	-1
	Rheumatism	58	72	42	4	3	51	24	-21		57	57	33	5	3	51	23	-20		67	72	48	5	3	68	20	-17
	Scarlatina	29	54	16	6	3	12	18	-15		23	73	17	7	4	8	30	-26		22	72	15	5	0	11	19	-19

Small-pox	7	69	5	7	3	3	3	0	5	80	4	12	0	4	5	-5	5	67	3	11	0	4	4	-4
Whooping-cough	35	73	25	4	7	33	7	0	34	74	25	5	4	35	18	-14	23	78	19	6	2	17	18	-16
OCTOBER.*									NOVEMBER.*								DECEMBER.*							
Av. for Tabulated Diseases Reported Prevalent.	44	67	30	4.3	7.2	66.7	26.9	-19.7	40	75	30	4.3	5.9	58.2	20.7	-14.8	39	77	30	4.0	5.3	53.7	22.3	-17.0
Bronchitis	70	70	48	4	9	119	42	-33	87	82	71	3	19	149	35	-16	91	85	77	3	12	153	45	-33
Cerebro-spinal Meningitis	10	59	6	6	5	8	9	-4	3	50	1	8	0	1	3	-3	8	40	3	6	3	4	1	+2
Cholera Infantum	23	51	12	6	4	24	16	-12	8	50	4	7	0	7	5	-5	4	33	1	7	1	2	1	0
Cholera Morbus	30	44	13	5	5	23	19	-14	16	35	6	6	1	9	5	-4	9	38	3	4	0	8	2	-2
Consumption, Pulmonary	71	75	54	5	8	140	9	-1	75	90	68	6	7	177	1	+6	73	89	65	5	9	155	13	-4
Croup, Membraneous	12	35	4	7	2	13	1	+1	16	44	7	6	2	12	3	-1	19	56	10	5	4	15	7	-3
Diphtheria	44	59	25	5	8	50	28	-20	46	59	29	5	12	30	33	-21	41	63	26	5	13	17	40	-27
Diarrhea	82	66	54	4	5	107	72	-67	58	61	35	5	3	54	35	-32	33	72	25	5	6	36	22	-16
Dysentery	56	47	26	5	2	45	44	-42	22	53	12	7	2	11	19	-17	15	50	7	6	1	10	9	-8
Erysipelas	32	49	15	6	4	29	15	-11	26	53	14	6	2	24	10	-8	27	62	17	6	2	24	17	-15
Fever, Intermittent	93	94	87	2	24	212	60	-36	88	92	81	2	14	145	64	-50	82	90	73	2	8	137	55	-47
Fever, Remittent	85	84	71	2	23	175	47	-24	75	85	64	3	16	116	38	-22	72	81	57	3	8	104	39	-31
Fever, Typhoid (Enteric)	35	70	23	5	6	49	17	-11	38	71	27	5	11	44	20	-9	28	65	18	6	5	28	17	-12
Fever, Typho-malarial	72	70	51	4	20	103	41	-21	55	72	40	4	13	80	20	-7	44	74	33	5	7	54	23	-25
Influenza	55	61	34	4	10	83	26	-16	55	77	43	3	11	94	20	-9	59	83	49	3	6	86	42	-36
Measles	1	60	2	8	0	7	1	-1	4	75	3	5	0	9	0	0	5	88	5	5	0	12	2	-2
Pneumonia	43	52	23	5	2	55	22	-20	57	71	40	5	8	72	31	-23	71	75	53	4	9	91	39	-3
Puerperal Fever	10	41	4	8	2	3	6	-4	11	38	4	6	0	11	5	-5	5	38	2	5	1	4	1	0
Rheumatism	84	78	65	4	10	147	60	-50	89	88	79	4	3	180	54	-51	86	87	75	4	10	146	46	-36
Scarlatina	34	53	19	5	6	24	39	-33	37	59	22	6	5	27	32	-27	26	71	18	4	5	15	27	-22
Small-pox	4	60	2	9	0	6	4	-4	1	75	1	4	0	3	0	0	0	0	0	0	0	0	0	0
Whooping-cough	26	65	18	5	3	45	14	-11	22	76	17	5	1	26	23	-22	21	70	15	5	1	27	11	-10

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 262.
*For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 10, page 260.
NOTE.—Graphic representations of statements of diseases by months, are given in three diagrams on pages following.

TABLE 2.—*Continued.—Diseases in the Upper-Peninsular and in the North-Western Divisions of the State.†—In Oct., Nov., and Dec., 1877.*

MONTHS.	DISEASES.	Per ct. of Observers Rep't'g Prev'ce of. b	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c.	Per ct. of Reports Stating Prev'ce of. d	Av. Order of Prevalence where Prev. e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe. f	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of. b	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c	Per ct. of Reports Stating Prev'ce of. d	Av. Order of Prevalence where Prev. e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe. f	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of. b	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c	Per ct. of Reports Stating Prev'ce of. d	Av. Order of Prevalence where Prev. e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe. f
UPPER-PENINSULAR DIVISION.†—OCTOBER.*	Av. for Tabulated Diseases Reported Prevalent.	100	84	84	2.8	0.8	3.2	0	+0.8	NOVEMBER.*	67	74	49	4.9	0.1	3.8	0	+0.1	DECEMBER.*	55	81	45	4.4	0.1	4.6	0.3	-0.2
	Bronchitis	100	100	100	3	1	4	0	+1		100	100	100	4	0	8	0	0		100	83	83	3	0	8	1	-1
	Cerebro-spinal Meningitis	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		----	------	----	----	----	----	----	------
	Cholera Infantum	0	0	0	0	0	0	0	0		50	50	25	7	0	2	0	0		33	25	8	7	0	1	0	0
	Cholera Morbus	0	0	0	0	0	0	0	0		50	25	13	4	0	1	0	0		33	75	25	7	0	3	0	0
	Consumption, Pulmonary	100	100	100	3	0	5	0	0		100	75	75	5	0	6	0	0		67	100	67	5	1	5	0	+1
	Croup, Membraneous	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		----	------	----	----	----	----	----	------
	Diphtheria	0	0	0	0	0	0	0	0		50	25	13	8	0	1	0	0		33	25	8	8	0	1	0	0
	Diarrhea	0	0	0	0	0	0	0	0		100	75	75	6	0	6	0	0		33	100	33	4	0	4	0	0
	Dysentery	0	0	0	0	0	0	0	0		50	50	25	7	0	2	0	0		33	25	8	5	0	1	0	0
	Erysipelas	0	0	0	0	0	0	0	0		50	75	38	6	0	3	0	0		33	100	33	7	0	4	0	0
	Fever, Intermittent	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		----	------	----	----	----	----	----	------
	Fever, Remittent	0	0	0	0	0	0	0	0		50	100	50	3	0	4	0	0		67	88	58	4	0	6	1	-1
	Fever, Typhoid (Enteric)	0	0	0	0	0	0	0	0		50	50	25	7	0	2	0	0		----	------	----	----	----	----	----	------
	Fever, Typho-malarial	100	100	100	1	0	0	0	0		50	100	50	1	2	2	0	+2		33	100	33	3	0	4	0	0
	Influenza	100	20	20	3	3	2	0	+3		100	75	75	4	0	6	0	0		67	75	50	3	0	5	1	-1
	Measles	0	0	0	0	0	0	0	0		50	100	50	3	0	4	0	0		67	100	67	1	0	7	1	-1
	Pneumonia	0	0	0	0	0	0	0	0		50	25	13	9	0	1	0	0		67	63	42	5	1	4	0	+1
	Puerperal Fever	0	0	0	0	0	0	0	0		50	50	25	6	0	2	0	0		83	75	25	7	0	3	0	0
	Rheumatism	100	100	100	4	0	5	0	0		100	100	100	5	0	8	0	0		100	83	83	5	0	9	0	0
	Scarlatina	0	0	0	0	0	0	0	0		50	75	38	4	0	3	0	0		33	100	33	4	0	4	0	0

	Small-pox	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----
	Whooping-cough	0	0	0	0	0	0	0	0		100	100	100	3	0	7	0	0		100	100	100	4	0	10	1	-1
NORTH-WESTERN DIVISION.†—OCTOBER.*	Av. for Tabulated Diseases Reported Prevalent.	100	45	45	1.8	0	1.4	0	0	NOVEMBER.*	No reports received from this Division for November and December.								DECEMBER.*								
	Bronchitis	100	25	25	1	0	1	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Cerebro-spinal Meningitis	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Cholera Infantum	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Cholera Morbus	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Consumption, Pulmonary	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Croup, Membraneous	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Diphtheria	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Diarrhea	100	100	100	2	0	4	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Dysentery	100	25	25	3	0	1	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Erysipelas	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Fever, Intermittent	100	50	50	2	0	1	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Fever, Remittent	100	25	25	1	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Fever, Typhoid (Enteric)	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Fever, Typho-malarial	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Influenza	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Measles	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Pneumonia	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Puerperal Fever	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Rheumatism	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Scarlatina	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Small pox	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----
	Whooping-cough	0	0	0	0	0	0	0	0		----	----	----	----	----	----	----	----		----	----	----	----	----	----	----	----

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a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 262.
* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 10, page 260.
† For counties in each Division, see Exhibit 1, page 113.

TABLE 2.—*Continued.—Diseases in the North-Eastern and in the Western Divisions of the State,†—In Oct., Nov., and Dec., 1877.*

MONTHS.	DISEASES.	Per ct. of Observers Rep't'g Prev'ce of.*b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev. *a, c*	Per ct. of Reports Stating Prev'ce of.*d*	Av. Order of Prevalence **where** Prev.*e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd **Usually** Severe.	Times Rep't'd **Less** than usually Severe.	Difference between Times "**More**" and "**Less**" Severe. *f*	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of.*b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev. *a, c*	Per ct. of Reports Stating Prev'ce of.*d*	Av. Order of Prevalence **where** Prev.*e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd **Usually** Severe.	Times Rep't'd **Less** than usually Severe.	Difference between Times "**More**" and "**Less**" Severe. *f*	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of.*b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev. *a, c*	Per ct. of Reports Stating Prev'ce of.*d*	Av. Order of Prevalence **where** Prev.*e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd **Usually** Severe.	Times Rep't'd **Less** than usually Severe.	Difference between Times "**More**" and "**Less**" Severe. *f*
NORTH-EASTERN DIVISION.†—OCTOBER.*	Av. for Tabulated Diseases Reported Prevalent.	100	40	40	3.3	0	0.7	0.7	-0.7	NOVEMBER.*	100	63	63	1.7	0.3	0.5	0.8	-0.5	DECEMBER.*	100	67	67	1.7	0.2	0.7	0.3	-0.2
	Bronchitis	100	100	100	1	0	4	0	0		100	100	100	1	1	1	2	-1		100	100	100	1	0	1	2	-2
	Cerebro-spinal Meningitis	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Cholera Infantum	100	20	20	6	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Cholera Morbus	100	20	20	4	0	0	1	-1		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Consumption, Pulmonary	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Croup, Membraneous	0	0	0	0	0	0	0	0		100	25	25	1	0	0	0	0		0	0	0	0	0	0	0	0
	Diphtheria	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		100	100	100	2	1	1	0	+1
	Diarrhea	100	20	20	2	0	0	1	-1		100	25	25	2	0	0	0	0		100	25	25	2	0	0	0	0
	Dysentery	100	20	20	3	0	0	1	-1		100	75	75	2	0	0	2	-2		0	0	0	0	0	0	0	0
	Erysipelas	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Fever, Intermittent	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Fever, Remittent	100	40	40	2	0	0	0	0		100	50	50	2	1	0	0	+1		100	50	50	1	0	0	0	0
	Fever, Typhoid (Enteric)	100	20	20	5	0	1	1	-1		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Fever, Typho-malarial	100	40	40	3	0	0	1	-1		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Influenza	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Measles	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Pneumonia	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Puerperal Fever	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Rheumatism	100	100	100	4	0	2	2	-2		100	100	100	2	0	2	1	-1		100	100	100	2	0	2	0	0
	Scarlatina	100	20	20	3	0	0	0	0		0	0	0	0	0	0	0	0		100	25	25	2	0	0	0	0

	Small-pox	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Whooping-cough	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
WESTERN DIVISION.†—OCTOBER*.	Av. for Tabulated Diseases Reported Prevalent.	41	58	25	3.4	0.5	2.6	1.4	-0.8	NOVEMBER.*	67	69	46	3.5	0.1	3.8	2.0	-1.9	DECEMBER.*	56	67	36	3.7	0.1	2.9	1.2	-1.2
	Bronchitis	20	40	9	4	1	1	0	+1		100	42	42	3	0	4	1	-1		100	33	33	4	0	3	1	-1
	Cerebro-spinal Meningitis	20	50	9	6	0	2	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Cholera Infantum	20	60	14	5	1	2	0	+1		33	50	17	3	0	1	1	-1		33	25	8	7	0	0	1	-1
	Cholera Morbus	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Consumption, Pulmonary	40	56	23	6	0	5	0	0		33	100	33	5	0	4	0	0		33	100	33	5	0	4	0	0
	Croup, Membraneous	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Diphtheria	60	67	36	2	0	3	3	-3		0	0	0	0	0	0	0	0		33	50	17	6	0	2	0	0
	Diarrhea	80	42	36	4	4	3	0	+4		33	25	8	6	0	0	1	-1		0	0	0	0	0	0	0	0
	Dysentery	20	20	5	5	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Erysipelas	60	46	27	3	0	5	0	0		0	0	0	0	0	0	0	0		33	25	8	2	0	1	0	0
	Fever, Intermittent	60	100	64	2	0	6	5	-5		100	58	58	3	0	2	5	-5		33	100	33	2	0	0	4	-4
	Fever, Remittent	60	86	55	1	0	4	7	-7		67	100	67	2	0	2	6	-6		100	75	75	2	0	3	5	-5
	Fever, Typhoid (Enteric)	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		33	25	8	6	0	1	0	0
	Fever, Typho malarial	40	70	32	4	0	1	3	-3		---	---	---	---	---	---	---	---		33	25	8	5	0	1	0	0
	Influenza	60	64	41	4	0	6	0	0		100	100	100	3	1	11	0	+1		100	100	100	3	1	11	0	+1
	Measles	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Pneumonia	40	50	23	3	0	5	0	0		67	75	50	4	0	4	2	-2		67	100	67	3	0	6	2	-2
	Puerperal Fever	20	20	5	6	1	0	0	+1		67	50	33	5	0	6	2	-2		33	25	8	5	0	0	1	-1
	Rheumatism	60	50	27	3	0	2	4	-4		67	75	50	5	0	4	2	-2		100	67	67	4	0	6	2	-2
	Scarlatina	20	20	5	3	0	0	1	-1		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Small-pox	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Whooping-cough	20	60	14	5	2	0	0	+2		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 262.

* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 10, page 260.

† For counties in each division, see Exhibit 1, page 113.

TABLE 2.—*Continued.—Diseases in the Central and in the Northern-Central Divisions of the State,†—In Oct., Nov., and Dec., 1877.*

MONTHS.	DISEASES.	Per ct. of Observers Rep't'g Prev'ce of.b	Av. Per ct. of Wks. Reported Prevalent where Prev.a, c	Per ct. of Reports Stating Prev'ce of.d	Av. Order of Prevalence where Prev.e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe.f	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of.b	Av. Per ct. of Wks. Reported Prevalent where Prev.a, c	Per ct. of Reports Stating Prev'ce of.d	Av. Order of Prevalence where Prev.e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe.f	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of.b	Av. Per ct. of Wks. Reported Prevalent where Prev.a, c	Per ct. of Reports Stating Prev'ce of.d	Av. Order of Prevalence where Prev.e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe.f
CENTRAL DIVISION.†—OCTOBER.*	Av. for Tabulated Diseases Reported Prevalent.	47	71	33	4.4	1.4	14.0	3.4	-2.0	NOVEMBER.*	46	70	33	4.6	1.0	11.7	3.9	-2.9	DECEMBER.*	46	76	34	4.0	0.9	11.0	4.4	-3.5
	Bronchitis	60	76	43	5	0	24	1	-1		79	77	61	3	0	28	2	-2		79	88	69	3	1	25	5	-4
	Cerebro-spinal Meningitis	7	40	3	13	0	0	2	-2		7	75	5	12	0	0	3	-3		0	0	0	0	0	0	0	0
	Cholera Infantum	33	57	18	6	1	7	4	-3		21	58	13	8	0	3	4	-4		0	0	0	0	0	0	0	0
	Cholera Morbus	23	58	16	6	1	7	2	-1		36	36	13	7	1	5	0	+1		0	0	0	0	0	0	0	0
	Consumption, Pulmonary	60	71	44	6	1	24	0	+1		71	88	63	7	1	29	0	+1		71	90	64	5	1	27	1	0
	Croup, Membraneous	7	33	1	7	0	1	0	0		14	38	5	4	2	1	0	+2		21	55	11	4	2	3	1	+1
	Diphtheria	47	59	28	5	3	9	6	-3		50	43	27	5	2	3	9	-7		36	74	25	3	3	1	7	-4
	Diarrhea	87	67	57	4	0	25	6	-6		50	61	31	3	0	14	0	0		29	80	22	5	1	10	0	+1
	Dysentery	60	53	31	5	1	6	11	-10		21	33	7	8	1	1	1	0		14	29	4	6	1	0	0	+1
	Erysipelas	33	57	18	5	2	6	1	+1		36	45	16	6	1	4	4	-3		21	64	13	8	1	2	4	-3
	Fever, Intermittent	87	95	81	2	3	38	4	-1		86	96	82	2	1	33	6	-5		86	83	71	3	0	27	5	-5
	Fever, Remittent	93	87	81	3	3	36	4	-1		79	89	70	3	3	26	4	-1		71	79	56	3	1	24	4	-3
	Fever, Typhoid (Enteric)	40	80	29	6	1	6	7	-6		50	75	38	5	2	5	11	-9		36	85	31	5	0	4	9	-9
	Fever, Typho-malarial	60	79	44	4	6	18	4	+2		50	71	36	5	2	13	5	-3		43	70	29	6	2	3	11	-9
	Influenza	60	67	41	4	1	23	2	-1		57	84	48	3	0	21	5	-5		64	89	56	2	0	21	8	-8
	Measles	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Pneumonia	33	57	18	6	1	3	8	-7		50	68	34	6	3	7	8	-5		71	67	47	4	1	12	8	-7
	Puerperal Fever	7	33	1	8	0	1	0	0		7	25	2	5	0	2	0	0		14	25	4	4	1	1	0	+1
	Rheumatism	80	72	56	4	1	26	3	-2		79	89	70	4	0	27	5	-5		79	79	62	3	0	23	6	-6
	Scarlatina	33	53	18	3	2	6	2	0		50	86	18	6	1	6	4	-3		21	50	11	4	0	2	4	-4

	Small-pox	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Whooping-cough	27	80	24	5	0	14	0	0		36	55	20	5	0	5	6	-6		21	55	11	8	0	2	2	-2
NORTHERN-CENTRAL DIVISION.†—OCTOBER.*	Av. for Tabulated Diseases Reported Prevalent.	100	84	84	4.1	0.5	1.1	1.1	-0.6	NOVEMBER.*	100	71	71	3.8	0.1	1.3	0.8	-0.6	DECEMBER.*	100	75	75	3.6	0.3	1.4	1.3	-1.0
	Bronchitis	0	0	0	0	0	0	3	0		100	33	33	5	0	1	0	0		100	25	25	3	1	0	0	+1
	Cerebro-spinal Meningitis	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	9	0	0	0
	Cholera Infantum	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Cholera Morbus	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Consumption, Pulmonary	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Croup, Membraneous	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Diphtheria	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Diarrhea	100	100	100	3	0	1	3	-3		100	100	100	5	0	0	3	-3		100	75	75	4	0	0	3	-3
	Dysentery	100	50	50	4	0	0	2	-2		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Erysipelas	100	50	50	7	1	0	1	0		100	67	67	6	0	1	1	-1		100	75	75	5	0	0	2	-2
	Fever, Intermittent	100	100	100	2	1	3	0	+1		100	100	100	2	0	1	2	-2		100	100	100	3	0	2	2	-2
	Fever, Remittent	100	100	100	4	0	2	2	-2		100	33	33	3	0	1	0	0		100	50	50	3	0	2	0	0
	Fever, Typhoid (Enteric)	100	100	100	5	1	1	1	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Fever, Typho-malarial	100	100	100	3	0	1	0	0		100	100	100	1	1	2	0	+1		100	75	75	1	0	3	0	0
	Influenza	0	0	0	0	0	0	0	0		100	33	33	4	0	1	0	0		100	100	100	4	1	2	1	0
	Measles	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Pneumonia	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Puerperal Fever	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Rheumatism	100	75	75	5	1	1	0	+1		100	100	100	4	0	3	0	0		100	100	100	6	0	2	2	-2
	Scarlatina	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Small-pox	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Whooping-cough	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0

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a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 262.
* For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 10, page 260. † For counties in each Division, see Exhibit 1, page 113.

TABLE 2.—*Continued.—Diseases in the Bay and Eastern and in the South-western Divisions of the State,†—In Oct., Nov., and Dec., 1877.*

MONTHS.	DISEASES.	Per ct. of Observers Rep't'g Prev'ce of.*b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev.*a, c*	Per ct. of Reports Stating Prev'ce of.*d*	Av. Order of Prevalence **where** Prev.*e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd **Less** than usually Severe.	Difference between Times "**More**" and "**Less**" Severe.*f*	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of.*b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev.*a, c*	Per ct. of Reports Stating Prev'ce of.*d*	Av. Order of Prevalence **where** Prev.*e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd **Less** than usually Severe.	Difference between Times "**More**" and "**Less**" Severe.*f*	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of.*b*	Av. Per ct. of Wks. Reported Prevalent **where** Prev.*a, c*	Per ct. of Reports Stating Prev'ce of.*d*	Av. Order of Prevalence **where** Prev.*e*	Times Rep't'd **More** than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd **Less** than usually Severe.	Difference between Times "**More**" and "**Less**" Severe.*f*
BAY AND EASTERN DIVISION.†—OCTOBER.*	Av. for Tabulated Diseases Reported Prevalent.	47	64	31	4.4	0.5	14.5	5.4	-5.0	NOVEMBER.*	46	74	35	4.4	0.9	12.1	4.6	-3.7	DECEMBER.*	45	73	33	4.2	0.8	10.2	4.4	-3.6
	Bronchitis	81	69	56	5	0	28	11	-11		93	89	83	4	6	29	10	-4		98	88	82	3	3	28	10	-7
	Cerebro-spinal Meningitis	13	60	8	6	0	2	3	-3		0	0	0	0	0	0	0	0		7	50	4	8	2	0	0	+2
	Cholera Infantum	13	30	4	6	0	3	0	0		7	25	2	6	0	1	0	0		0	0	0	0	0	0	0	0
	Cholera Morbus	81	36	12	6	1	2	6	-5		0	0	0	0	0	0	0	0		14	25	4	6	0	1	1	-1
	Consumption, Pulmonary	94	65	63	5	1	39	4	-3		73	93	69	6	0	36	0	0		71	93	67	5	0	30	5	-5
	Croup, Membraneous	13	30	4	4	0	3	0	0		27	50	14	6	0	5	1	-1		50	44	22	4	2	4	2	0
	Diphtheria	56	44	24	5	2	7	4	-2		53	68	36	5	1	6	8	-7		57	65	36	5	0	3	14	-14
	Diarrhea	88	65	57	4	0	19	21	-21		60	60	36	5	1	6	7	-6		57	58	33	4	2	6	4	-2
	Dysentery	44	44	19	5	0	8	5	-5		20	50	10	5	0	2	4	-4		14	38	5	4	0	1	1	-1
	Erysipelas	31	29	9	7	0	1	5	-5		27	44	12	5	1	2	0	+1		36	30	11	6	0	2	1	-1
	Fever, Intermittent	100	97	97	1	1	56	9	-8		87	96	83	1	1	30	13	-12		86	94	80	2	0	32	6	-6
	Fever, Remittent	88	89	77	3	1	41	9	-8		73	91	66	3	0	24	9	-9		50	89	45	2	2	16	1	+1
	Fever, Typhoid (Enteric)	31	38	12	6	0	6	1	-1		13	38	5	8	0	3	1	-1		7	25	2	9	0	1	0	0
	Fever, Typho-malarial	63	60	37	4	0	12	9	-9		60	67	41	4	0	13	6	-6		57	75	44	5	0	15	7	-7
	Influenza	56	58	33	3	1	13	6	-5		53	63	34	3	5	9	5	0		57	69	40	5	0	7	11	-11
	Measles	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		7	50	4	8	0	1	1	-1
	Pneumonia	50	47	24	6	0	14	2	-2		73	70	51	6	0	18	9	-9		86	72	62	5	2	18	7	-5
	Puerperal Fever	19	53	11	8	1	1	2	-1		20	33	7	9	0	1	2	-2		0	0	0	0	0	0	0	0
	Rheumatism	81	87	69	4	1	35	12	-11		87	88	76	4	1	34	5	-4		79	88	69	5	1	26	6	-5
	Scarlatina	13	30	4	9	0	2	2	-2		27	40	10	8	0	3	2	-2		14	100	13	3	1	1	3	-2

	October.*								November.*								December.*							
Small-pox	6	100	7	4	0	5	0	0	7	75	5	4	0	3	0	0	0	0	0	0	0	0	0	0
Whooping-cough	25	60	16	4	1	7	3	-2	20	83	17	4	1	4	5	-4	21	50	11	5	0	1	4	-4
South-Western Division.†																								
Av. for Tabulated Diseases Reported Prevalent.	59	62	37	3.9	1.6	8.0	4.7	-3.1	56	74	41	3.6	1.3	9.6	2.6	-1.4	50	79	40	3.5	0.7	7.6	4.4	-3.7
Bronchitis	56	57	30	5	3	5	4	-1	100	78	78	3	4	21	3	+1	100	94	94	3	1	21	8	-7
Cerebro-spinal Meningitis	22	40	9	5	0	2	3	-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera Infantum	33	60	21	5	1	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera Morbus	33	27	9	4	3	2	0	+3	22	38	8	4	0	2	1	-1	22	25	6	5	0	1	1	-1
Consumption, Pulmonary	100	74	74	5	6	19	2	+4	100	92	92	4	4	26	1	+3	89	96	84	5	4	20	3	+1
Croup, Membraneous	22	20	5	6	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diphtheria	22	20	5	4	1	1	0	+1	56	50	28	4	1	6	2	-1	22	43	9	5	1	1	1	0
Diarrhea	78	63	51	4	0	8	13	-13	67	54	36	4	0	9	2	-2	11	50	6	3	1	1	0	+1
Dysentery	56	36	21	5	0	4	5	-5	11	25	3	6	1	0	0	+1	0	0	0	0	0	0	0	0
Erysipelas	56	57	30	6	1	7	3	-2	11	100	11	6	0	2	0	0	33	50	16	5	0	1	4	-4
Fever, Intermittent	100	98	98	2	3	26	12	-9	100	92	92	2	2	22	6	-4	100	81	81	2	1	15	10	-9
Fever, Remittent	100	91	91	2	4	25	8	-4	89	81	72	2	1	18	4	-3	89	77	72	2	1	12	10	-9
Fever, Typhoid (Enteric)	22	57	9	3	1	3	0	+1	22	75	17	4	0	6	0	0	22	71	16	6	0	2	3	-3
Fever, Typho-malarial	100	51	51	4	1	15	6	-5	67	67	44	4	3	9	3	0	22	88	22	4	0	3	4	-4
Influenza	67	50	35	4	2	8	4	-2	67	51	36	3	2	7	2	0	56	94	50	3	0	10	6	-6
Measles	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pneumonia	33	27	9	6	0	2	1	-1	33	58	19	4	0	4	2	-2	56	72	41	5	0	8	5	-5
Puerperal Fever	0	0	0	0	0	0	0	0	11	25	3	3	0	0	1	-1	0	0	0	0	0	0	0	0
Rheumatism	100	74	74	4	2	14	14	-12	100	89	89	4	1	21	6	-5	89	93	88	4	2	17	9	-7
Scarlatina	67	64	42	5	1	4	12	-11	33	83	28	6	1	0	9	-8	22	50	9	3	0	1	2	-2
Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whooping-cough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	25	3	3	0	1	0	0

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a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, page 262.

* For number of Observers, Reports, Weeks in each Month, etc., see Exhibit 10, page 260.

† For counties in each Division, see Exhibit 1, page 113.

TABLE 2.—*Continued.—Diseases in the Southern-Central and in the South-Eastern Divisions of the State,†—In Oct., Nov., and Dec., 1877.*

MONTHS.	DISEASES.	Per ct. of Observers Rep't'g Prev'ce of.b	Av. Per ct. of Wks. Reported Prevalent where Prev.a, c	Per ct. of Reports Stating Prev'ce of.d	Av. Order of Prevalence where Prev.e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between times "More" and "Less" Severe. f	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of.b	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c	Per ct. of Reports Stating Prev'ce of.d	Av. Order of Prevalence where Prev.e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe. f	MONTHS.	Per ct. of Observers Rep't'g Prev'ce of.b	Av. Per ct. of Wks. Reported Prevalent where Prev. a, c	Per ct. of Reports Stating Prev'ce of.d	Av. Order of Prevalence where Prev. e	Times Rep't'd More than usually Severe.	Times Rep't'd Usually Severe.	Times Rep't'd Less than usually Severe.	Difference between Times "More" and "Less" Severe. f.
SOUTHERN-CENTRAL DIVISION.†—OCTOBER.*	Av. for Tabulated Diseases Reported Prevalent.	50	67	33	3.6	1.9	18.0	6.3	-4.4	NOVEMBER.*	42	79	33	3.8	1.6	12.4	6.4	-4.8	DECEMBER.*	45	76	34	3.7	1.2	11.4	6.0	-4.8
	Bronchitis	84	67	56	4	2	27	16	-14		76	84	64	3	2	27	12	-10		88	79	69	3	0	31	11	-11
	Cerebro-spinal Meningitis	11	90	10	5	5	2	1	+4		0	0	0	0	0	0	0	0		12	43	5	6	1	0	0	+1
	Cholera Infantum	16	36	5	4	1	1	3	-2		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Cholera Morbus	32	50	15	5	0	7	3	-3		12	56	6	6	0	1	2	-2		6	25	2	2	0	1	0	0
	Consumption, Pulmonary	68	75	51	5	0	33	3	-3		71	94	67	5	0	39	0	0		83	79	69	5	2	34	2	0
	Croup, Membraneous	0	0	0	0	0	0	0	0		6	25	2	7	0	0	0	0		0	0	0	0	0	0	0	0
	Diphtheria	37	65	24	4	0	12	8	-8		29	53	15	4	0	5	3	-3		29	37	11	3	0	1	4	-4
	Diarrhea	84	58	48	4	1	22	12	-11		47	69	33	5	2	8	12	-10		29	75	23	5	1	7	6	-5
	Dysentery	58	36	20	5	0	10	6	-6		18	75	14	7	0	1	7	-7		18	45	8	5	0	1	3	-3
	Erysipelas	26	40	11	5	0	6	0	0		12	63	8	4	0	5	0	0		24	80	18	7	1	8	0	+1
	Fever, Intermittent	100	88	88	1	7	45	15	-8		100	91	91	2	5	29	21	-16		94	92	86	2	4	29	20	-16
	Fever, Remittent	84	79	67	2	6	40	11	-5		65	93	59	8	3	20	11	-8		76	86	65	8	1	20	15	-14
	Fever, Typhoid (Enteric)	37	70	28	8	3	14	1	+2		47	70	32	4	7	7	4	+3		29	35	11	4	1	4	2	-1
	Fever, Typho-malarial	79	74	58	3	8	29	10	-2		53	75	41	4	5	19	2	+3		47	71	34	4	5	9	4	+1
	Influenza	37	65	24	4	0	14	5	-5		29	85	26	3	0	11	6	-6		41	84	32	8	0	10	7	-7
	Measles	0	0	0	0	0	0	0	0		6	25	2	2	0	1	0	0		0	0	0	0	0	0	0	0
	Pneumonia	32	45	14	8	0	11	0	0		53	71	36	4	1	16	4	-3		71	78	54	4	2	20	7	-5
	Puerperal Fever	11	33	3	5	0	1	2	-2		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Rheumatism	79	79	62	4	3	27	14	-11		88	78	70	4	1	23	21	-20		76	90	68	4	3	25	10	-7
	Scarlatina	32	55	17	5	1	6	8	-7		29	84	24	5	2	5	9	-7		85	75	28	4	0	4	11	-11

	SOUTH-EASTERN DIVISION.†—OCTOBER.*								NOVEMBER.*								DECEMBER.*							
Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whooping-cough	37	54	20	4	0	15	2	-2	18	58	11	6	0	6	1	-1	6	75	5	4	0	3	0	0
Av. for Tabulated Diseases Reported Prevalent.	54	75	41	5.3	1.8	15.5	7.8	-6.0	55	78	43	5.1	2.1	17.1	5.5	-3.4	45	85	39	4.4	2.2	14.8	5.4	-3.3
Bronchitis	71	81	57	4	2	25	10	-8	86	88	75	3	6	30	5	+1	94	96	89	3	6	36	7	-1
Cerebro-spinal Meningitis	0	0	0	0	0	0	0	0	7	25	2	4	0	1	0	0	19	33	5	6	0	4	1	-1
Cholera Infantum	29	65	19	8	0	4	8	-8	0	0	0	0	0	0	0	0	6	50	4	6	1	1	0	+1
Cholera Morbus	36	52	18	6	0	5	7	-7	14	25	4	6	0	0	2	-2	6	100	4	1	0	2	0	0
Consumption, Pulmonary	64	95	61	6	0	15	0	0	86	88	75	5	2	37	0	+2	69	90	66	5	1	35	2	-1
Croup, Membraneous	36	43	15	9	1	9	0	+1	29	50	14	8	0	6	2	-2	31	75	21	6	0	8	4	-4
Diphtheria	57	76	43	7	2	18	7	-5	64	81	52	6	8	9	11	-3	56	77	48	6	8	7	14	-6
Diarrhea	71	91	64	5	0	25	16	-16	64	61	39	6	0	11	10	-10	31	90	32	8	1	8	9	-8
Dysentery	71	68	48	6	1	16	14	-13	36	55	20	8	0	5	5	-5	25	79	20	8	0	7	5	-5
Erysipelas	14	90	13	14	0	4	5	-5	43	50	21	8	0	7	5	-5	19	100	20	10	0	6	6	-6
Fever, Intermittent	100	94	94	2	9	37	15	-6	86	94	80	3	5	28	11	-6	81	98	77	3	3	32	8	-5
Fever, Remittent	79	79	63	3	9	27	6	+3	79	75	50	4	8	21	4	+4	63	79	46	3	3	21	3	0
Fever, Typhoid (Enteric)	50	84	40	6	0	18	6	-6	64	78	50	6	2	21	4	-2	50	82	41	6	4	16	3	+1
Fever, Typho-malarial	79	81	64	5	5	27	8	-3	67	72	46	5	0	22	4	-4	44	83	34	5	0	16	6	-6
Influenza	71	65	46	3	3	17	9	-6	64	92	59	2	3	28	2	+1	69	78	57	2	4	20	8	-4
Measles	14	60	9	8	0	7	1	-1	7	100	7	11	0	4	0	0	7	100	7	10	0	4	0	0
Pneumonia	79	66	52	5	1	20	11	-10	71	83	59	6	4	22	6	-2	75	79	61	4	3	23	10	-7
Puerperal Fever	7	40	3	19	0	0	2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rheumatism	100	78	78	5	2	35	11	-9	100	95	95	4	0	58	14	-14	100	91	91	3	4	36	11	-7
Scarlatina	57	59	33	5	2	6	14	-12	57	63	36	6	1	10	8	-7	31	78	25	5	4	3	7	-3
Small-pox	14	40	6	12	0	1	4	-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whooping-cough	36	72	27	8	0	9	9	-9	29	100	29	8	0	4	11	-11	31	83	27	5	1	10	4	-3

a, b, c, d, e, f. For foot-notes and for unabbreviated headings, see first page of this table, pages 262-263.

* For Number of Observers, Reports, Weeks in each Month, etc., see first five columns in Exhibit 10, page 260.

† For counties in each division, see Exhibit 1, page 113.

TABLE 3.—*Diseases, by Localities in Michigan,—Three Months ending* **December** *29, 1877. (First nine months of the year are tabulated on pages 308-343 of the Fifth Annual Report.) The first four pages are for the Five Weeks ending* **November** *3, 1877.*

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED. (Health Officers in Italics; those also Correspondents marked with a *.)	No. of Reports Rec'd.	Bronchitis.		Cerebro-Spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).	
		Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§
ALL LOCALITIES‖	386	70	4	59	6	51	6	44	5	75	5	35	7	59	5	66	4	47	5	49	6	94	2	84	2	70	5
UPPER-PENINSULAR DIVISION †																											
Marquette, Geo. J. Northrop	5	100	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH-WESTERN DIVISION.†																											
Fyfe Lake, H. T. Calkins	4	25	1	0	0	0	0	0	0	0	0	0	0	0	0	100	2	25	3	0	0	50	2	25	1	0	0
NORTH-EASTERN DIVISION.																											
Alpena, Wm. P. Maiden	5	100	1	0	0	20	6	20	4	0	0	0	0	0	0	20	2	20	3	0	0	0	0	40	2	20	5
WESTERN DIVISION.†																											
Cannonsburgh, C. L. Chamberlin	3	0	0	0	0	0	0	0	0	0	0	0	0	33	1	0	0	0	0	33	2	0	0	0	0	0	0
Grand Haven, *A. Vander Veen*	5	40	4	0	0	60	5	0	0	20	7	0	0	0	0	60	5	0	0	0	0	100	2	100	1	0	0
Grand Rapids, A. Hazlewood	4	0	0	50	6	0	0	0	0	100	5	0	0	75	3	25	6	0	0	0	0	100	2	100	1	0	0
Rockford, D. W. C. Burch	5	----	----	----	----	----	----	----	----	----	----	----	----	80	2	20	3	20	5	60	4	100	1	----	----	----	----
Holland, *B. Ledeboer*	5	0	0	0	0	0	0	0	0	----	----	0	0	0	0	60	1	0	0	40	3	0	0	60	1	0	0
CENTRAL DIVISION.†																											
Charlotte and vicinity, G. B. Allen	5	100	3	40	13	100	7	80	9	100	14	0	0	60	12	100	2	80	11	0	0	100	2	100	5	100	12
DeWitt, G. W. Topping	5	100	5	0	0	0	0	0	0	0	0	0	0	0	0	100	4	0	0	0	0	100	2	100	2	100	3
Elsie, E. V. Chase	5	0	0	0	0	60	2	40	3	0	0	0	0	100	1	80	2	40	2	0	0	100	2	100	2	0	0
Flint, H. P. Seymour	3	100	6	0	0	67	9	33	8	100	5	33	7	100	2	100	4	100	9	100	7	100	2	100	4	100	10
Ionia, *Wm. B. Thomas*	3	33	7	----	----	33	6	67	5	----	----	----	----	----	----	100	2	33	3	----	----	100	4	100	3	33	5
Hastings, A. P. Drake	5	0	0	0	0	0	0	0	0	100	4	0	0	20	5	60	2	40	3	0	0	100	1	0	0	0	0
Howell, C. V. Beebe	5	60	6	0	0	0	0	0	0	100	7	0	0	60	8	40	4	40	5	20	8	100	1	100	2	0	0
Hubbardston, H. W. Browne	5	----	----	----	----	----	----	----	----	20	5	----	----	----	----	60	3	----	----	----	----	40	3	60	1	----	----
Lansing, J. W. Hagadorn	4	100	8	0	0	0	0	0	0	100	7	0	0	75	3	25	11	75	8	0	0	100	4	100	2	25	1
Lansing, J. B. Hull	5	----	----	----	----	----	----	----	----	----	----	----	----	20	2	----	----	----	----	----	----	----	----	100	2	0	0
Lyons, D. C. Spalding	5	0	0	0	0	20	5	0	0	20	4	0	0	0	0	40	4	0	0	0	0	100	1	100	2	0	0
Mason, *H. Henry Cook*	3	100	2	0	0	0	0	33	3	0	0	0	0	0	0	100	2	0	0	100	3	100	1	100	2	0	0
North Lansing, O. Marshall	5	60	4	0	0	0	0	0	0	100	3	0	0	0	0	20	5	40	4	80	4	100	3	60	4	100	3
Otisville, A. W. Nicholson	5	40	1	0	0	0	0	0	0	20	2	0	0	0	0	80	2	0	0	20	5	100	1	20	3	0	0
Ovid, O. B. Campbell	5	0	0	0	0	0	0	0	0	----	----	0	0	0	0	0	0	40	4	0	0	0	0	100	1	0	0
NORTHERN-CENTRAL DIVISION.†																											
Big Rapids, *W. S. Whitney*	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	50	4	50	7	100	2	100	4	100	5
BAY AND EASTERN DIVISION.†																											
Bay City, W. H. Burr	5	100	5	0	0	0	0	20	7	100	5	0	0	0	0	60	4	40	5	0	0	100	1	100	2	0	0
Bay City, W. R. Marsh	5	40	7	0	0	20	7	0	0	80	6	20	4	80	5	40	7	20	4	20	6	100	1	100	2	0	0
East Saginaw, Nelson H. Claflin	5	100	6	100	6	0	0	0	0	100	9	0	0	0	0	100	5	100	4	40	11	100	1	80	11	40	11
East Saginaw, *M. J. Liddell*	5	40	3	0	0	0	0	0	0	60	3	40	4	0	0	0	0	20	4	0	0	100	1	60	2	0	0
Lapeer, *H. McColl*	3	100	4	0	0	0	0	0	0	0	0	0	0	67	6	100	3	33	5	0	0	100	1	100	2	0	0
Lapeer, A. Nash	4	25	9	0	0	0	0	0	0	100	8	0	0	25	7	100	6	0	0	25	6	100	1	100	5	0	0
Lexington, A. M. Oldfield	5	60	4	0	0	0	0	60	4	100	5	0	0	0	0	80	1	0	0	0	0	80	3	80	3	0	0

Port Huron, H. R. Mills	5	0	0	0	0	0	0	0	0	20	2	0	0	0	0	40	3	0	0	20	3	100	1	0	0	80	2
Port Huron, M. Northup	4	0	0	0	0	0	0	0	0	100	4	0	0	25	6	100	2	75	6	0	0	100	2	100	3	0	0
Port Huron, C. M. Stockwell	4	50	4	0	0	0	0	0	0	25	3	0	0	0	0	25	4	0	0	0	0	100	1	75	2	25	1
Port Huron, *A. A. Whitney*	5	100	1	0	0	0	0	20	5	40	5	0	0	80	4	0	0	0	0	0	0	100	2	100	3	0	0
Port Sanilac, J. M. Loop	5	----	----	----	----	----	----	----	----	20	3	----	----	40	2	20	2	----	----	----	----	80	1	----	----	----	----
Saginaw City, *N. D. Lee*	5	100	5	0	0	40	5	60	7	100	7	0	0	0	0	100	4	20	4	0	0	100	1	80	6	20	11
St. Clair, *C. G. Robertson*	5	20	4	20	5	----	----	----	----	20	9	----	----	20	4	60	5	----	----	----	----	100	2	100	1	20	6
Thornville, J. S. Caulkins	5	100	4	0	0	0	0	0	0	20	6	0	0	40	7	80	3	0	0	40	8	100	1	80	3	0	0
West Bay City, I. E. Randall	5	60	6	0	0	0	0	20	6	100	5	0	0	20	6	40	5	0	0	0	0	100	1	100	2	0	0
SOUTH-WESTERN DIVISION.†																											
Allegan, H. S. Lay	5	40	4	60	5	0	0	0	0	100	5	20	6	0	0	80	5	20	5	0	0	100	1	100	2	0	0
Benton Harbor, John Bell	5	0	0	20	4	0	0	40	3	100	2	0	0	0	0	20	3	0	0	20	4	100	1	20	3	0	0
Dowagiac, *H. S. McMaster*	5	80	6	0	0	80	7	0	0	100	9	0	0	20	4	80	7	40	7	60	8	100	2	100	1	0	0
Mattawan, Thos. H. Briggs	5	80	4	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	60	4	100	3	100	3	0	0
Niles, Simeon Belknap	3	33	6	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	100	6	100	2	100	1	100	4
Niles, J. S. Reeves	5	40	7	----	----	----	----	20	6	20	4	20	5	----	----	60	5	40	4	60	6	100	1	100	2	----	----
Otsego, Milton Chase	5	0	0	0	0	0	0	0	0	20	6	0	0	0	0	60	3	0	0	0	0	80	3	100	3	----	----
Paw Paw, J. Andrews	5	0	0	0	0	40	3	20	2	40	2	0	0	0	0	60	2	40	3	0	0	100	1	100	1	20	1
St. Joseph, R. F. Stratton	5	0	0	0	0	60	5	0	0	100	4	0	0	20	3	80	3	40	4	0	0	100	1	100	2	----	----
SOUTHERN-CENTRAL DIVISION.†																											
Adrian, Robert Stephenson	5	60	3	0	0	0	0	40	4	20	5	0	0	40	4	60	3	20	3	0	0	100	1	40	4	20	4
Albion, J. P. Stoddard	5	100	2	0	0	60	4	80	4	80	3	0	0	0	0	80	4	80	4	100	3	100	1	80	2	0	0
Ann Arbor, W. F. Breakey	4	25	6	0	0	0	0	75	5	100	8	0	0	0	0	100	5	50	5	0	0	100	2	100	2	100	4
Blissfield, Hal C. Wyman	5	20	1	0	0	0	0	0	0	60	6	0	0	0	0	40	5	20	4	20	4	100	1	0	0	100	3
Brooklyn, E. N. Palmer	5	20	2	0	0	0	0	0	0	0	0	0	0	20	3	80	3	20	4	0	0	80	1	100	2	0	0
Clinton, A. W. Alvord	5	40	8	100	7	0	0	0	0	100	8	0	0	0	0	60	4	60	3	40	8	100	1	80	2	0	0
Coldwater, *L. H. Wurtz**	5	40	5	0	0	0	0	0	0	0	0	0	0	100	5	40	5	0	0	0	0	100	2	100	1	100	5
Hudson, A. R. Smart	4	100	4	0	0	25	4	75	4	100	6	0	0	75	4	100	4	25	6	0	0	100	1	100	2	100	3
Jackson (State Prison), E. L. Kimball	5	100	1	0	0	0	0	20	4	100	4	0	0	0	0	40	5	20	6	0	0	100	2	0	0	0	0
Kalamazoo, W. B. Southard	5	0	0	0	0	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	100	1	100	2	0	0
Marshall, *H. L. Joy**	5	100	2	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	0	0	0	20	4	0	0	0	0
Mendon, H. C. Clapp	5	100	4	0	0	0	0	0	0	0	0	0	0	0	0	20	3	20	5	0	0	100	1	100	2	0	0
Mendon, Edwin Stewart	5	80	4	0	0	0	0	0	0	100	4	0	0	0	0	80	3	0	0	0	0	100	1	80	2	0	0
Parma, A. M. Bucknum	5	40	4	80	3	0	0	0	0	100	2	0	0	100	2	60	2	0	0	0	0	40	2	100	2	----	----
Sturgis, N. I. Packard	5	80	5	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	20	6	100	1	100	2	0	0
Tecumseh, C. M. Woodward	5	80	2	0	0	0	0	0	0	60	2	0	0	0	0	20	5	0	0	0	0	40	1	40	2	0	0
Three Rivers, C. W. Backus	5	80	5	0	0	0	0	20	9	40	10	0	0	0	0	100	4	20	10	0	0	100	1	100	5	0	0
York, F. M. Oakley	5	0	0	0	0	20	3	0	0	20	3	0	0	0	0	40	3	60	3	20	3	100	2	40	3	100	1
Ypsilanti, *Edward Batwell**	5	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	0	0	0	0	100	2	20	2	40	2
SOUTH-EASTERN DIVISION.†																											
Detroit, Leartus Connor	5	100	4	0	0	0	0	0	0	100	4	0	0	80	10	100	9	100	11	80	13	100	2	100	9	0	0
Detroit, W. H. Rouse	5	100	3	0	0	80	15	80	13	100	7	80	19	100	14	100	9	100	11	100	15	100	2	100	1	100	6
Dearborn, E. S. Snow	5	60	6	----	----	----	----	20	5	----	----	40	6	100	4	100	5	40	4	----	----	100	5	40	3	80	3
Milford, Robert Johnston	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	100	3	25	4	0	0	100	1	0	0	100	4
Monroe, *Edward Dorsch*	5	100	6	0	0	100	5	80	6	100	4	40	6	100	4	100	5	80	5	0	0	100	1	100	2	100	6
Northville, J. M. Swift	5	----	----	----	----	----	----	----	----	----	----	----	----	20	4	----	----	----	----	----	----	80	2	80	2	----	----
Plymouth, Willard Chaney	5	80	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	0	100	3	0	0	0	0
Pontiac, W. G. Elliott	3	100	3	0	0	0	0	67	4	67	12	33	6	100	7	100	4	100	5	0	0	100	3	67	4	67	8
Pontiac, *Robert LeBaron*	5	80	9	0	0	0	0	0	0	100	10	0	0	80	5	80	6	80	6	0	0	100	1	100	1	100	4
Pontiac, J. P. Wilson	5	60	1	0	0	0	0	20	4	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
Utica, Wm. Brownell	5	0	0	0	0	20	9	0	0	100	9	20	9	0	0	100	6	40	5	0	0	60	4	100	3	40	10
Walled Lake, E. A. Chapman	5	0	0	0	0	0	0	0	0	80	3	0	0	0	0	0	0	0	0	0	0	80	1	40	2	0	0
Wyandotte, E. P. Christian	5	40	3	----	----	60	2	----	----	100	4	----	----	----	----	60	2	100	3	----	----	100	1	60	1	----	----
Wyandotte, *T. J. Langlois*	5	0	0	0	0	0	0	0	0	100	5	0	0	40	6	80	4	0	0	0	0	100	1	80	2	0	0

*, †, ‡, §, ‖. For explanations and references, see foot-notes on pages 283, 285; for comments, see pages 256-7, 261, 263; for full headings, see pages 286, 288.

TABLE 8.—*Diseases, by Localities in Michigan, Five Weeks ending* **November** *3, 1877*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *. For full names of Observers, and Divisions, see pages 278–279.)	No. of Reports Rec'd.	Fever, Typho-malarial. Per Cent of Wks. Prev.‡	Fever, Typho-malarial. Av. Order of Prevalence.§	Influenza. Per Cent of Wks. Prev.‡	Influenza. Av. Order of Prevalence.§	Measles. Per Cent of Wks. Prev.‡	Measles. Av. Order of Prevalence.§	Pneumonia. Per Cent of Wks. Prev.‡	Pneumonia. Av. Order of Prevalence.§	Puerperal Fever. Per Cent of Wks. Prev.‡	Puerperal Fever. Av. Order of Prevalence.§	Rheumatism. Per Cent of Wks. Prev.‡	Rheumatism. Av. Order of Prevalence.§	Scarlatina. Per Cent of Wks. Prev.‡	Scarlatina. Av. Order of Prevalence.§	Small-pox. Per Cent of Wks. Prev.‡	Small-pox. Av. Order of Prevalence.§	Whooping-cough. Per Cent of Wks. Prev.‡	Whooping-cough. Av. Order of Prevalence.§
ALL LOCALITIES	386	70	4	61	4	60	8	52	5	41	8	78	4	53	5	60	9	65	5
UPPER PENIN. DIV.†																			
Marquette,—G. J. N. a	5	100	1	20	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0
NORTH-WESTERN DIV.†																			
Fyfe Lake,—H. T. C. b	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH-EASTERN DIV.†																			
Alpena,—W. P. M. c	5	40	3	0	0	0	0	0	0	0	0	100	4	20	3	0	0	0	0
WESTERN DIVISION.†																			
Cannonsburg,—C. L. C.	3	0	0	0	0	0	0	0	0	0	0	33	1	0	0	0	0	0	0
Grand Haven,—*A. V.*	5	40	5	60	4	0	0	20	4	0	0	80	4	0	0	0	0	0	0
Grand Rapids,—A. H.	4	0	0	100	4	0	0	0	0	0	0	25	4	0	0	0	0	0	0
Rockford,—D. W. C. B.	5	100	2	40	4	----	----	----	----	20	6	----	----	----	----	----	----	60	5
Holland,—*B. L.* d	5	----	----	0	0	0	0	80	2	0	0	0	0	20	3	0	0	0	0
CENTRAL DIVISION.†																			
Charlotte & vic.,—G. B. A.	5	100	8	100	4	0	0	100	11	0	0	100	5	0	0	0	0	100	12
DeWitt,—G. W. T. e	5	0	0	0	0	0	0	0	0	0	0	80	5	0	0	0	0	0	0
Elsie,—E. V. C. f	5	0	0	0	0	0	0	0	0	0	0	40	2	0	0	0	0	0	0
Flint,—H. P. S. g	3	67	9	67	4	0	0	100	10	33	8	100	5	33	8	0	0	0	0
Ionia,—*Wm. B. T.*	3	100	3	----	----	----	----	33	4	----	----	33	5	----	----	----	----	----	----
Hastings,—A. P. D.	5	0	0	40	3	0	0	0	0	0	0	0	0	0	0	0	0	100	3
Howell,—C. V. B.	5	100	3	100	5	0	0	20	1	0	0	100	6	20	1	0	0	20	2
Hubbardston,—H. W. B. h	5	20	5	60	2	----	----	40	2	----	----	60	4	----	----	----	----	----	----
Lansing,—J. W. H. i	4	100	3	100	5	0	0	0	0	0	0	100	6	0	0	0	0	0	0
Lansing,—J. B. H. j	5	80	2	----	----	----	----	----	----	----	----	60	3	80	1	----	----	----	----
Lyons,—D. C. S.	5	80	3	60	4	0	0	0	0	0	0	0	0	20	5	0	0	0	0
Mason,—*H. H. C.*	3	67	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0
North Lansing,—O. M.	5	0	0	0	0	0	0	0	0	0	0	60	4	0	0	0	0	100	1
Otisville,—A. W. N.	5	0	0	40	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ovid,—O. B. C.	5	0	0	40	4	0	0	0	0	0	0	40	4	100	2	0	0	0	0
N.-CENTRAL DIV.†																			
Big Rapids,—*W. & W.*	4	100	3	0	0	0	0	0	0	0	0	75	5	0	0	0	0	0	0
BAY AND EASTERN DIV.†																			
Bay City,—W. H. B.	5	40	6	0	0	0	0	20	6	0	0	100	3	0	0	0	0	0	0
Bay City,—W. R. M. k	5	100	4	60	3	0	0	40	6	0	0	40	6	0	0	0	0	0	0
East Saginaw,—N. H. C.	5	100	3	0	0	0	0	100	8	40	10	100	4	40	11	0	0	60	8
East Saginaw,—*M. J. L.* l	5	20	2	20	4	0	0	0	0	0	0	60	3	0	0	0	0	40	3
Lapeer,—*H. McC.*	3	67	3	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0
Lapeer,—A. N.	4	100	3	100	3	0	0	50	6	0	0	100	7	0	0	0	0	0	0
Lexington,—A. M. O.	5	0	0	80	1	0	0	60	5	0	0	100	5	0	0	0	0	100	2
Port Huron,—H. R. M.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Huron,—M. N.	4	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Prevalent.‡	Av. Order of Prevalence when Prev.§
a	Tonsilitis	20	2
b	Neuralgia	25	1
	Malarial Infection	50	1
c	Apoplexy and tonsilitis, each	20	3
	One case of scarlatina, the first in a long time; origin unknown; occurred in a large well-ventilated house.		
d	Bilious remittent fever	100	1
e	Apoplexy and gonorrhea, each	20	6
	Asthma and chorea, each	40	9
	Colic, hysteralgia, and urticaria, each	20	7
	Diabetes	40	9
	Dropsy	60	8
	Goitre	40	7
	Neuralgia	40	5
	Pharyngitis	100	6
f	Nephritis	20	3
g	Heart, valvular disease of	33	10
	Pleurisy and emphysema	33	10
	Tonsilitis	67	9
h	There is sickness, but no disease is prevalent, 2 weeks ending Oct. 13.		
i	Asthma	25	10
	Catarrhal fever	25	11
j	Angina pectoris	40	3
	Constipation	20	2
k	Very little sickness	80	
	Very wet weather, Oct. 20.		
l	Anæmia and dropsy abdom., each	20	4
	Gastric fever, int.	20	3
	Inflam. of liver, and jaundice, each	40	4
	Marasmus	20	2
	Neuralgia, facial	40	4
	Piles	80	3
m	Partial paralysis, 1 case	20	
n	Not many sick, Oct. 20.		
	Neuralgia (mostly malarial)	40	2
o	Unusually healthy, Oct. 27.		
p	Generally healthy, Oct. 13.		

Port Huron,—C. M. S......*m*	4	0	0	75	3	0	0	75	3	0	0	100	3	0	0	0	0	0	0
Port Huron,—*A. A. W.*......	5	20	4	20	1	0	0	0	0	0	0	0	0	20	6	0	0	0	0
Port Sanilac,—J. M. L.......	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	40	2
Saginaw City,—*N. D. L.*...*n*	5	20	10	0	0	0	0	0	0	80	9	100	2	0	0	0	0	0	0
St. Clair,—*C. G. R.*...........	5	40	5	20	6	----	----	20	3	40	5	40	5	----	----	----	----	----	----
Thornville,—J. S. C.	5	100	4	100	4	0	0	20	7	0	0	100	6	0	0	0	0	0	0
West Bay City,—I. E. R....	5	0	0	60	4	0	0	0	0	0	0	100	4	0	0	100	4	0	0
SOUTH-WESTERN DIV.†																			
Allegan,—H. S. L...........*o*	5	40	5	0	0	0	0	20	6	0	0	100	5	0	0	0	0	0	0
Benton Harbor,—J. B.......	5	20	4	0	0	0	0	0	0	0	0	60	3	20	5	0	0	0	0
Dowagiac,—*H. S. McM.*....*p*	5	100	3	60	8	0	0	40	9	0	0	100	7	80	6	0	0	0	0
Mattawan,—T. H. B.........*q*	5	40	1	60	2	0	0	0	0	0	0	100	3	80	2	0	0	0	0
Niles,—S. B..................*r*	3	100	4	0	0	0	0	0	0	0	0	100	6	100	8	----	----	----	----
Niles,—J. S. R...............*s*	5	20	7	20	3	----	----	----	----	----	----	100	4	----	----	----	----	----	----
Otsego,—M. C................	5	20	2	80	3	0	0	0	0	0	0	40	3	100	4	0	0	0	0
Paw Paw,—J. A..............*t*	5	40	2	40	2	0	0	20	2	0	0	40	2	20	2	0	0	0	0
St. Joseph,—R. F. S.........*u*	5	100	4	40	7	0	0	0	0	0	0	40	4	0	0	0	0	0	0
S.-CENTRAL DIV.†																			
Adrian,—R. S..................*v*	5	60	3	0	0	0	0	20	2	0	0	80	3	40	3	0	0	20	2
Albion,—J. P. S.............*w*	5	0	0	100	2	0	0	80	4	0	0	100	3	100	2	0	0	40	5
Ann Arbor,—W. F. B........	4	100	4	0	0	0	0	0	0	0	0	100	8	0	0	0	0	0	0
Blissfield,—Hal C. W........	5	60	2	0	0	0	0	40	3	0	0	40	5	0	0	0	0	0	0
Brooklyn,—E. N. P...........	5	20	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clinton,—A. W. A............	5	100	5	20	4	0	0	0	0	0	0	100	4	20	8	0	0	20	6
Coldwater,—*L. H. W.**....*x*	5	100	3	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0
Hudson,—A. R. S............*y*	4	100	3	75	4	0	0	75	4	25	6	75	4	75	4	0	0	0	0
Jackson,(S.Pris.),—E. L. K.*z*	5	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0
Kalamazoo,—W. B. S......*aa*	5	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marshall,—*H L. J.**........	5	0	0	100	2	0	0	20	4	0	0	100	2	0	0	0	0	0	0
Mendon,—H. C. C..........*bb*	5	0	0	40	6	0	0	0	0	0	0	60	4	0	0	0	0	100	5
Mendon,—E. S...............*cc*	5	60	4	20	3	0	0	0	0	0	0	100	3	0	0	0	0	80	3
Parma,—A. M. B.............	5	100	3	0	0	0	0	0	0	40	4	0	0	80	3	0	0	20	3
Sturgis,—N. I. P.............	5	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tecumseh,—C. M. W........	5	20	3	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0
Three Rivers,—C. W. B..*dd*	5	20	9	100	6	0	0	0	0	0	0	100	5	20	9	0	0	100	7
York,—F. M. O................	5	80	2	0	0	0	0	40	3	0	0	20	3	0	0	0	0	0	0
Ypsilanti,—*E. B.**.........*ee*	5	100	2	0	0	0	0	0	0	0	0	20	4	0	0	0	0	0	0
SOUTH-EASTERN DIV.†																			
Detroit,—L. C.................	5	100	6	100	2	100	10	100	11	0	0	100	6	100	9	20	6	100	11
Detroit,—W. H. R.........*ff*	5	100	10	100	4	0	0	100	7	40	19	100	9	100	9	60	18	100	15
Dearborn,—E. S. S..........	5	80	1	40	3	----	----	40	6	----	----	100	6	----	----	----	----	----	----
Milford,—R. J.................	4	0	0	0	0	0	0	0	0	0	0	25	6	50	5	0	0	0	0
Monroe,—*E. D.*...........*gg*	5	100	4	80	5	20	6	100	6	0	0	100	4	100	5	0	0	60	6
Northville,—J. M. S......*hh*	5	80	1	20	4	----	----	----	----	----	----	20	3	----	----	----	----	----	----
Plymouth,—W. C............	5	100	2	20	2	0	0	80	5	0	0	40	4	0	0	0	0	0	0
Pontiac,—W. G. E..........*ii*	3	67	10	67	2	0	0	67	6	0	0	100	3	33	3	0	0	----	----
Pontiac,—*R. LeB.*...........	5	100	2	100	5	0	0	80	7	0	0	100	8	0	0	0	0	0	0
Pontiac.—J. P. W...........	5	40	5	0	0	0	0	0	0	0	0	60	3	20	5	----	----	----	----
Utica,—W. B..................*jj*	5	100	6	100	1	0	0	60	7	0	0	100	5	0	0	0	0	0	0
Walled Lake,—E. A. C.....	5	20	4	20	2	0	0	20	1	0	0	60	3	0	0	0	0	0	0
Wyandotte,—E. P. C........	5	----	----	----	----	----	----	60	3	----	----	80	3	40	3	----	----	80	1
Wyandotte,—*T. J. L.*........	5	0	0	0	0	0	0	20	3	0	0	100	3	20	4	0	0	20	7

q	Myelitis	60	4
	Peritonitis	20	4
	Typhoid-pneumonia	20	6
r	Sickness decreased, Oct. 20.		
s	Stomatitis	20	5
	Tonsilitis	20	4
t	Amenorrhœa	20	1
	Asthma, Bright's disease, cystitis, and gonorrhea, each	20	2
	Gonorrheal rheumatism, and hypertrophy of heart, each	20	2
	Myelitis	20	3
u	Consumption probably always present.		
v	Cystitis	20	5
	Diabetes	20	3
	Diabetes incip., diabetes mel., and	20	3
	nephritis, each	20	5
	Neuralgia	20	2
	Paralysis and pleuritis, each	20	4
w	See note *w* for Oct., on page 290.		
x	Bilious colic	40	4
y	Pleurisy	25	5
z	Boils	20	5
	Syphilis	20	3
	Tonsilitis and vaccination, each	20	4
aa	Have not seen so healthy an October in 15 years, Nov. 3.		
bb	Abortion, accidental; quinsy, each.	20	6
	Rheumatism, sciatic	40	4
cc	Bright's disease, hematuria, each	20	6
	Cerebral vertigo	60	4
	Lumbago	20	4
	Paralysis	80	5
	Spinal conges., and tonsilitis, each	20	5
	See note *cc* for Oct., on page 290.		
dd	Catarrh	80	3
	See note *dd* for Oct., on page 290.		
ee	Neuralgia	20	3
	Intermittent neuralgia	40	----
	Very little sickness, w'k end. Oct. 20		
ff	Very healthy	80	
	See note *ff* for Oct., on page 290.		
gg	Neuralgia	40	5
	Quinsy	40	4
hh	Continued fever	20	2
	Chicken-pox	40	1
	Failure in nutrition	20	3
	See note *hh* for Oct., on page 290.		
ii	Spasmodic croup, and peritonitis, each	33	3
jj	Indigestion	100	5
	Tonsilitis	40	4

*, †, ‡, §, *a*, *b*, *c*, etc. For explanations and references, see pages 283, 285; for comments, see pages 256–7, 261, 263; for full headings, see pages 286, 288.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **December** *1, 1877.*

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *.)	No. of Reports Rec'd.	Bronchitis.		Cerebro-spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).	
		Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§	Per Cent of W'ks Prev.‡	Av. Order of Prevalence.§
ALL LOCALITIES‖	300	82	3	50	8	50	7	35	6	90	6	44	6	59	5	61	5	53	7	53	6	92	2	85	3	71	5
UPPER-PENINSULAR DIVISION.†																											
Calumet, C. W. Niles	4	100	6	----	----	50	7	----	----	50	6	----	----	25	8	100	5	50	7	75	6	----	----	100	3	50	7
Marquette, G. J. Northrop	4	100	2	0	0	0	0	25	4	100	4	0	0	0	0	50	6	0	0	0	0	0	0	0	0	0	0
NORTH-EASTERN DIVISION.†																											
Alpena, W. P. Maiden	4	100	1	0	0	0	0	0	0	0	0	25	1	0	0	25	2	75	2	0	0	0	0	50	2	0	0
WESTERN DIVISION.†																											
Grand Haven, *A. Vander Veen*	4	75	2	----	----	50	3	----	----	----	----	----	----	----	----	25	6	----	----	----	----	50	3	100	2	----	----
Grand Rapids, A. Hazlewood	4	25	5	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	2	100	1	0	0
Holland, *B. Ledeboer*	4	25	3	0	0	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	25	3	----	----	0	0
CENTRAL DIVISION.†																											
Charlotte, *G. B. Allen**	4	100	3	0	0	75	8	25	12	100	12	0	0	25	11	100	4	25	10	25	8	100	4	100	6	100	9
Charlotte and vicinity, G. B. Allen	4	100	1	75	12	75	7	25	10	100	14	0	0	75	13	100	5	0	0	25	10	100	4	100	6	100	11
DeWitt, G. W. Topping	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	50	4	25	5	0	0	100	3	75	3	100	1
Elsie, E. V. Chase	4	25	1	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	25	5	100	3	100	3	0	0
Flint, H. P. Seymour	4	75	3	----	----	25	8	25	7	50	8	50	6	100	1	75	5	50	8	100	5	100	3	100	4	50	6
Hastings, A. P. Drake	4	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
Howell, C. V. Beebe	4	100	5	0	0	0	0	0	0	100	7	0	0	25	2	25	1	0	0	0	0	100	2	100	3	0	0
Hubbardston, H. W. Browne	4	50	4	0	0	0	0	0	0	100	6	0	0	25	7	0	0	0	0	0	0	100	2	100	3	100	5
Lansing, J. B. Hull	4	----	----	----	----	----	----	----	----	----	----	----	----	25	1	----	----	----	----	----	----	----	----	75	2	25	1
Lyons, D. C. Spalding	4	75	4	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	2	25	2	0	0
Mason, *H. Henry Cook*	4	100	2	0	0	0	0	75	2	0	0	25	2	0	0	50	2	0	0	0	0	100	2	100	2	0	0
North Lansing, O. Marshall	4	----	----	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	50	3	75	2	0	0	50	8
Otisville, A. W. Nicholson	4	50	2	0	0	0	0	0	0	100	3	0	0	0	0	25	1	0	0	0	0	75	1	0	0	0	0
Ovid, O. B. Campbell	4	75	2	0	0	0	0	25	3	25	4	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0
NORTHERN-CENTRAL DIVISION.†																											
Big Rapids, *W. & Whitney*	3	33	5	0	0	0	0	0	0	0	0	0	0	0	0	100	5	0	0	67	6	100	2	33	3	0	0
BAY AND EASTERN DIVISION.†																											
Bay City, W. H. Burr	4	100	5	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0
Bay City, W. R. Marsh	4	100	7	0	0	0	0	0	0	100	9	100	8	100	7	100	6	0	0	100	8	100	1	100	2	0	0
East Saginaw, Nelson H. Claflin	4	100	1	0	0	0	0	0	0	100	7	0	0	0	0	100	5	25	5	0	0	100	2	0	0	0	0
East Saginaw, Samuel Kitchen	4	100	2	0	0	0	0	0	0	100	9	0	0	0	0	100	7	75	7	0	0	100	2	100	3	50	10
East Saginaw, *M. J. Liddell*	4	75	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	2	75		0	0
Lapeer, *H. McColl*	3	100	1	0	0	0	0	0	0	0	0	0	0	100	5	33	2	0	0	0	0	100	2	67		0	0
Lapeer, A. Nash	4	100	7	0	0	0	0	0	0	100	9	0	0	100	5	50	6	0	0	0	0	100	1	100	5	0	0
Lexington, A. M. Oldfield	4	100	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	25	5	0	0	75	5	0	0
Port Huron, H. R. Mills	4	50	2	0	0	0	0	0	0	0	0	0	0	25	2	25	4	0	0	25	3	100	1	0	0	0	0
Port Huron, *A. A. Whitney*	4	100	1	0	0	25	6	0	0	50	5	25	4	25	5	25	4	0	0	0	0	100	2	75	3	0	0
Port Sanilac, J. M. Loop	4	----	----	----	----	----	----	----	----	----	----	----	----	50	1	----	----	50	2	----	----	----	----	----	----	----	----

Saginaw, *N. D. Lee*	4	100	4	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
St. Clair, *C. G. Robertson*	4	25	5	0	0	0	0	0	0	75	6	25	6	0	0	75	5	0	0	25	3	75	1	100	2	0	0
Thornville, John S. Caulkins	4	100	4	0	0	0	0	0	0	100	7	0	0	50	6	25	6	0	0	0	0	100	1	100	2	25	5
West Bay City, I. E. Randall	4	100	5	0	0	0	0	0	0	100	4	50	5	100	6	0	0	0	0	0	0	100	1	100	2	0	0
SOUTH-WESTERN DIVISION.†																											
Allegan, H. S. Lay	4	100	1	0	0	0	0	0	0	100	4	0	0	0	0	100	4	25	6	0	0	100	2	75	4	0	0
Benton Harbor, John Bell	4	50	5	0	0	0	0	25	6	100	4	0	0	25	6	100	3	0	0	0	0	100	1	75	2	0	0
Dowagiac, *H. S. McMaster*	4	75	5	0	0	0	0	0	0	100	6	0	0	50	6	25	8	0	0	0	0	100	1	100	3	0	0
Mattawan, Thos. H. Briggs	4	100	3	0	0	0	0	0	0	100	3	0	0	75	3	0	0	0	0	0	0	100	2	100	3	0	0
Niles, Simeon Belknap	4	100	5	0	0	0	0	0	0	100	8	0	0	0	0	0	0	0	0	100	6	100	2	100	2	100	5
Niles, James S. Reeves	4	75	5	----	----	----	----	----	----	75	4	----	----	----	----	25	4	----	----	----	----	100	1	75	2	----	----
Otsego, Milton Chase	4	75	3	0	0	0	0	0	0	100	6	0	0	50	5	0	0	0	0	0	0	100	3	50	1	0	0
Paw Paw, J. Andrews	4	25	2	0	0	0	0	50	2	100	2	0	0	0	0	50	3	0	0	0	0	100	1	75	2	50	2
St. Joseph, R. F. Stratton	4	100	1	0	0	0	0	0	0	50	3	0	0	50	1	25	2	0	0	0	0	25	2	0	0	0	0
SOUTHERN-CENTRAL DIVISION.†																											
Adrian, Robert Stephenson	4	75	3	0	0	0	0	0	0	0	0	0	0	25	3	25	3	0	0	0	0	100	1	0	0	25	3
Albion, John P. Stoddard	4	100	3	0	0	0	0	25	8	100	3	25	7	0	0	100	6	100	6	100	4	100	2	100	2	0	0
Ann Arbor, W. F. Breakey	4	25	10	0	0	0	0	75	3	100	9	0	0	0	0	100	7	100	5	0	0	100	3	100	2	100	5
Blissfield, Hal C. Wyman	3	33	4	0	0	0	0	0	0	67	7	0	0	33	5	0	0	0	0	0	0	100	1	100	2	100	3
Brooklyn, E. N. Palmer	3	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	1	67	2	100	4
Coldwater, *L. H. Wurtz**	4	100	3	0	0	0	0	0	0	0	0	0	0	75	3	0	0	0	0	0	0	100	2	100	3	25	4
Hudson, A. R. Smart	4	100	3	0	0	0	0	0	0	100	7	0	0	0	0	100	5	0	0	0	0	100	1	100	2	0	0
Jackson (State Prison), E. L. Kimball	4	100	1	----	----	----	----	----	----	100	5	----	----	----	----	25	5	----	----	----	----	100	3	----	----	25	8
Kalamazoo, W. B. Southard	4	0	0	0	0	0	0	0	0	100	5	0	0	75	4	0	0	0	0	0	0	100	1	100	3	0	0
Marshall, *H. L. Joy**	4	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	75	4	0	0	0	0
Mendon, H. C. Clapp	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0
Mendon, Edwin Stewart	4	100	2	0	0	0	0	0	0	100	4	0	0	0	0	50	4	0	0	0	0	100	2	50	3	0	0
Sturgis, Nelson I. Packard	4	100	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	2	100	1	0	0
Tecumseh, C. M. Woodward	4	0	0	0	0	0	0	0	0	75	2	0	0	0	0	0	0	0	0	0	0	50	1	0	0	0	0
Three Rivers, C. W. Backus	4	100	4	0	0	0	0	0	0	75	10	0	0	0	0	100	6	25	9	0	0	100	1	100	6	0	0
York, F. M. Oakley	4	0	0	0	0	0	0	0	0	100	2	0	0	0	0	50	3	0	0	25	3	75	1	0	0	100	2
Ypsilanti, *Edward Batwell**	4	----	----	0	0	0	0	0	0	0	0	0	0	50	4	0	0	0	0	0	0	75	3	0	0	100	2
SOUTH-EASTERN DIVISION.‡																											
Dearborn, E. S. Snow	4	50	3	25	4	0	0	0	0	25	5	50	6	25	5	25	3	0	0	25	7	75	5	100	4	0	0
Detroit, Leartus Connor	4	100	2	0	0	0	0	0	0	100	5	0	0	100	12	100	8	100	13	100	13	100	3	100	10	50	14
Detroit, W. H. Rouse	4	100	2	0	0	0	0	0	0	100	8	25	14	100	12	50	13	25	14	100	13	100	5	100	2	100	8
Milford, Robert Johnston	4	100	2	0	0	0	0	0	0	75	4	0	0	0	0	25	3	25	5	0	0	100	1	0	0	75	5
Monroe, *Edward Dorsch*	4	100	4	0	0	0	0	25	6	100	4	100	4	100	3	100	6	0	0	25	6	100	1	100	2	100	6
Northville, J. M. Swift	4	50	1	0	0	0	0	0	0	50	3	0	0	0	0	0	0	0	0	0	0	0	0	75	3	0	0
Plymouth, Willard Chaney	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	25	6	0	0	25	5	100	4	0	0	50	4
Pontiac, W. G. Elliott	4	100	1	0	0	0	0	25	5	100	7	0	0	100	4	50	6	50	7	0	0	100	4	25	9	100	7
Pontiac, *R. LeBaron*	4	100	7	0	0	0	0	0	0	100	8	0	0	100	6	0	0	0	0	25	6	100	2	100	1	100	2
Pontiac, John P. Wilson	4	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	25	4
Utica, Wm Brownell	4	0	0	0	0	0	0	0	0	100	7	25	7	50	9	100	6	0	0	0	0	0	0	100	3	100	8
Walled Lake, E. A. Chapman	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	2	25	3	0	0
Wyandotte, E. P. Christian	4	50	3	0	0	0	0	0	0	100	4	0	0	75	2	75	2	75	2	----	----	50	4	50	3	0	0
Wyandotte, *T. J. Langlois*	4	100	2	0	0	0	0	0	0	100	5	0	0	75	5	0	0	0	0	0	0	100	2	50	6	0	0

NOTE.—For comments on this table, see pages 256-7, 261, 263; for full headings, see pages 286, 288. *, †, §, ‖ For these references, see page 285.

‡ When less than the full number of reports for the month have been received from any Observer, the number against his name in the column "Per Cent of Weeks Prevalent," for any disease, is the per cent which the number of weeks he reports the disease present is of the number of cards received from him. When less than 2 reports have been received from any Observer for a month of 4 weeks, or less than 3 for a month of 5 weeks, they have not been compiled. When for any week no statement has been made by an Observer, with regard to a disease, and for the other weeks it has been marked 0, the columns for that disease against his name have been left blank. For the purposes of this compilation, each month is made to end on the Saturday nearest the end of the corresponding calendar month. In compiling this table, a fraction less than one-half is rejected, a fraction equal to or greater than one-half is counted as one.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **December** *1, 1877*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *. For full names of Observers and Divisions, see pages 282-3.)	No. of Reports Rec'd.	Fever, Typho-malarial. Per Ct. of Wks. Prevalent.‡	Fever, Typho-malarial. Av. Order of Prevalence.§	Influenza. Per Ct. of Wks. Prevalent.‡	Influenza. Av. Order of Prevalence.§	Measles. Per Ct. of Wks. Prevalent.‡	Measles. Av. Order of Prevalence.§	Pneumonia. Per Ct. of Wks. Prevalent.‡	Pneumonia. Av. Order of Prevalence.§	Puerperal Fever. Per Ct. of Wks. Prevalent.‡	Puerperal Fever. Av. Order of Prevalence.§	Rheumatism. Per Ct. of Wks. Prevalent.‡	Rheumatism. Av. Order of Prevalence.§	Scarlatina. Per Ct. of Wks. Prevalent.‡	Scarlatina. Av. Order of Prevalence.§	Small-pox. Per Ct. of Wks. Prevalent.‡	Small-pox. Av. Order of Prevalence.§	Whooping-cough. Per Ct. of Wks. Prevalent.‡	Whooping-cough. Av. Order of Prevalence.§
ALL LOCALITIES ‖	300	72	4	77	3	75	5	71	5	38	6	88	4	59	6	75	4	76	5
UPPER-PENIN. DIV.†																			
Calumet,—C. W. N.	4	----	----	50	5	100	3	25	9	50	6	100	5	75	4	----	----	100	1
Marquette,—G. J. N. *a*	4	100	1	100	3	0	0	0	0	0	0	100	5	0	0	0	0	100	5
NORTH-EASTERN DIV.†																			
Alpena,—W. P. M. *b*	4	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
WESTERN DIV.†																			
Grand Haven,—*A. V.*	4	----	----	100	3	----	----	50	5	----	----	50	6	----	----	----	----	----	----
Grand Rapids,—A. H. *c*	4	0	0	100	3	0	0	0	0	50	6	100	4	0	0	0	0	0	0
Holland,—*B. L.* *d*	4	----	----	100	2	0	0	100	3	50	8	0	0	0	0	0	0	0	0
CENTRAL DIV.†																			
Charlotte,—*G. B. A.**	4	100	7	100	1	0	0	100	10	0	0	100	4	25	13	0	0	25	11
Charlotte and vic.,—G. B. A.	4	100	8	100	2	0	0	100	10	0	0	100	4	25	12	0	0	75	10
DeWitt,—G. W. T. *e*	4	0	0	0	0	0	0	25	4	0	0	75	4	0	0	0	0	0	0
Elsie, E. V. C. *f*	4	75	2	0	0	0	0	0	0	0	0	0	0	25	5	0	0	0	0
Flint,—H. P. S. *g*	4	75	7	100	4	----	----	75	6	25	5	100	4	25	5	----	----	----	----
Hastings,—A. P. D.	4	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0	100	3
Howell,—C. V. B.	4	50	4	100	4	0	0	0	0	0	0	100	5	25	1	0	0	25	2
Hubbardston,—H. W. B. *h*	4	----	----	100	4	0	0	0	0	0	0	100	5	0	0	0	0	0	0
Lansing, J. B. H.	4	50	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Lyons,—D. C. S.	4	50	4	50	2	0	0	50	4	0	0	100	5	25	5	0	0	0	0
Mason,—*H. H. C.* *i*	4	0	0	25	2	0	0	50	3	0	0	75	2	0	0	0	0	0	0
North Lansing,—O. M. *j*	4	0	0	0	0	0	0	75	3	0	0	100	3	0	0	0	0	50	1
Otisville,—A. W. N.	4	0	0	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0
Ovid,—O. B. C.	4	0	0	0	0	0	0	0	0	0	0	25	3	100	1	0	0	0	0
N. CENTRAL DIV. †																			
Big Rapids,—*W. & W.*	3	100	1	33	4	0	0	0	0	0	0	100	4	0	0	0	0	0	0
BAY AND EASTERN DIV.†																			
Bay City.—W. H. B.	4	75	4	25	2	0	0	100	6	0	0	100	4	0	0	0	0	0	0
Bay City,—W. R. M. *k*	4	100	4	100	4	0	0	100	5	0	0	100	5	0	0	0	0	0	0
East Saginaw,—N. H. C.	4	25	3	0	0	0	0	100	7	0	0	75	4	0	0	0	0	100	3
East Saginaw,—S. K. *l*	4	50	9	0	0	0	0	75	8	25	13	100	4	25	15	0	0	0	0
East Saginaw,—*M. J. L.* *m*	4	50	8	0	0	0	0	0	0	0	0	75	1	0	0	0	0	0	0
Lapeer,—*H. McC.*	3	0	0	0	0	0	0	67	4	0	0	67	3	67	3	0	0	0	0
Lapeer,—A. N.	4	100	3	100	2	0	0	50	8	25	8	100	5	25	10	0	0	0	0
Lexington,—A. M. O. *n*	4	0	0	100	1	0	0	100	4	0	0	100	4	0	0	0	0	100	2
Port Huron,—H. R. M.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Huron,—*A. A. W.*	4	0	0	100	2	0	0	0	0	0	0	25	6	50	5	0	0	0	0
Port Sanilac,—J. M. L.	4	----	----	25	1	----	----	25	2	----	----	----	----	----	----	----	----	----	----
Saginaw,—*N. D. L.* *o*	4	0	0	0	0	0	0	0	0	0	0	100	8	0	0	0	0	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Prevalent.‡	Av. Order of Prevalence when Prevalent.§
a	Tonsilitis	100	2
	Ophthalmia	75	6
b	Asthma, cystorrhœa, and orchitis, each	25	2
	Nephritis	25	3
	Tonsilitis	75	2
c	See note "*c*" for Nov., on page 290.		
d	Bilious remittent fever	100	2
	Jaundice	100	3
e	Infant. convulsions, dropsy, and inf. epilepsy, and tympanitis, each	25	5
	Neuralgia	25	2
	Pharyngitis	100	2
	Scrofula, pleurisy, waxy liver, each	25	4
f	Hepatitis	25	6
	Laryngitis and nephritis, each	25	5
g	Follicular pharyngitis, gastritis, and pyemia, each	25	5
	Tonsilitis	50	5
	Typhoid pneumonia	25	7
h	Catarrh	25	1
i	Tuberculous meningitis	25	3
j	Enteritis	50	3
	Pelvic cellulitis	25	4
	Pleuritis and tonsilitis, each	25	3
k	Very little sickness	100	
	Apoplexy, one case		
l	Epilepsy	50	9
	Gastritis	25	7
	Hepatitis	25	5
	Nettle-rash	25	8
m	Billious colic	25	4
	General debility	25	2
	Jaundice	75	3
	Neuralgia	50	3
	Vertigo	25	4
n	See note "*n*" for Nov., on page 290.		
o	Neuralgia	100	2
	Very little sickness	100	

St. Clair,—*C. G. R.*........*p*	4	50	3	0	0	0	0	75	5	50	5	100	4	0	0	0	0	0	0	*p*	Very little sickness and that mild, week ending Nov. 17.		
Thornville,—J. S. C.	4	100	3	25	5	0	0	25	6	0	0	100	7	0	0	0	0	0	0				
West Bay City,—I. E. R...	4	50	5	25	5	0	0	50	6	0	0	100	4	0	0	75	4	50	6				
SOUTH-WESTERN DIV.†																							
Allegan,—H. S. L............	4	25	5	0	0	0	0	50	4	0	0	100	4	0	0	0	0	0	0				
Benton Harbor,—J. B.....*q*	4	0	0	50	6	0	0	0	0	0	0	25	3	0	0	0	0	0	0	*q*	The present season probably the most healthy we have ever experienced here, Nov. 20.		
Dowagiac,—*H. & McM.*.....	4	100	5	100	3	0	0	100	5	0	0	100	6	0	0	0	0	0	0				
Mattawan,—T. H. B.......*r*	4	0	0	75	1	0	0	0	0	0	0	75	1	100	1	0	0	0	0	*r*	Myelitis............ Nephritis............ Rheumatic fever............	100 25 25	5 5 1
Niles.—S. B...............*s*	4	50	5	50	4	0	0	0	0	0	0	100	7	100	9	0	0	0	0	*s*	See note "*s*" for Nov., on page 290.		
Niles,—J. S. R.	4	----	----	----	----	----	----	25	4	----	----	100	4	----	----	----	----	----	----				
Otsego,—M. C...............*t*	4	100	3	25	3	0	0	0	0	0	0	100	5	50	8	0	0	0	0	*t*	See note "*t*" for Nov., on page 290.		
Paw Paw,—J. A............*u*	4	25	3	25	1	0	0	0	0	25	3	100	2	0	0	0	0	0	0	*u*	Cancer of stomach............ Cystitis............ Dyspepsia............ Leucorrhea, gonorrhea, myelitis, and neuralgia, each............ Nephritis and spinal irritation, each Tonsilitis............	50 25 75 25 50 25	3 3 2 2 2 3
Saint Joseph,—R. F. S......	4	100	2	----	----	----	----	----	----	----	----	100	2	----	----	----	----	----	----				
SOUTH'N-CENTRAL DIV.†																							
Adrian,—R. S.	4	75	3	0	0	0	0	0	0	0	0	25	3	50	2	0	0	0	0				
Albion,—J. P. S............*v*	4	50	9	100	2	0	0	100	6	0	0	100	4	100	3	0	0	0	0	*v*	See note "*v*" for Nov., on page 290.		
Ann Arbor,—W. F. B.......	4	100	4	0	0	0	0	0	0	0	0	100	8	0	0	0	0	0	0				
Blissfield,—H. C. W........	3	0	0	0	0	0	0	100	4	0	0	33	5	0	0	0	0	0	0				
Brooklyn,—E. N. P..........	3	0	0	0	0	0	0	33	2	0	0	0	0	67	3	0	0	0	0				
Coldwater.—*L. H. W.**...*w*	4	100	4	0	0	0	0	75	5	0	0	100	2	0	0	0	6	0	0	*w*	Tonsilitis............	25	3
Hudson,—A. R. S...........*x*	4	50	2	100	3	0	0	100	4	0	0	100	5	100	5	0	0	0	0	*x*	Chicken-pox............ Peritonitis............	25 50	6 6
Jackson (State Pris.)—E. L. K. *y*	4	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	----	----	*y*	Asthma............ Tonsilitis............	25 100	7 4
Kalamazoo,—W. B. S.......	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Marshall,—*H. L. J.**	4	0	0	100	3	0	0	50	3	0	0	100	2	0	0	0	0	0	0				
Mendon,—H. C. C............	4	25	6	0	0	0	0	75	5	0	0	100	5	0	0	0	0	25	5				
Mendon,—E. S. ....*z*	4	0	0	0	0	0	0	25	5	----	----	100	4	0	0	0	0	50	4	*z*	Amenorrhea, catarrhal fever, and spinal congestion, each............ Bright's disease and vertigo, each.. Cerebral vertigo and spinal irritation, each............ Gastro-enteritis and neuralgia, each Kidney disease............ Spinal paralysis............	25 25 25 25 50 75	4 6 5 6 4 4
Sturgis,—N. I. P.............	4	0	0	0	0	0	0	75	3	0	0	25	6	0	0	0	0	0	0				
Tecumseh,—C. M. W........	4	0	0	0	0	0	0	0	0	0	0	50	2	0	0	0	0	0	0				
Three Rivers,—C. W. B..*aa*	4	0	0	100	6	0	0	0	0	0	0	100	4	100	10	0	0	100	8	*aa*	See note "*aa*" for Nov., on page 290.		
York,—F. M. O..............	4	75	2	25	3	25	2	0	0	0	0	100	3	0	0	0	0	0	0				
Ypsilanti,—*E. B.**........*bb*	4	100	2	0	0	0	0	0	0	0	0	25	4	0	0	0	0	0	0	*bb*	Very little illness............	50	
SOUTH-EASTERN DIV.†																							
Dearborn,—E. S. S..........	4	75	3	100	2	0	0	100	6	0	0	100	6	0	0	0	0	0	0				
Detroit,—L. C. ....*cc*	4	100	10	100	2	100	11	100	13	0	0	100	5	100	9	0	0	100	10	*cc*	Croup, spasmodic............	25	3
Detroit,—W. H. R.......*dd*	4	100	11	100	3	0	0	100	4	0	0	100	6	100	8	0	0	100	12	*dd*	Little sickness .... Diseases of respiratory organs take the lead, 3 weeks ending Dec. 1.	100	
Milford,—R. J.	4	0	0	0	0	0	0	0	0	0	0	100	4	50	4	0	0	0	0				
Monroe,—*E. D.*............*ee*	4	100	4	100	3	0	0	100	4	0	0	100	3	25	6	0	0	100	6	*ee*	Dropsy .... Neuralgia............ Quinsy	25 100 100	6 5 4
Northville,—J. M. S......*ff*	4	0	0	0	0	0	0	50	3	----	----	100	2	0	0	0	0	0	0	*ff*	Imperfect nutrition............ Consumption, 2 cases, Nov. 17. Enteritis............	50 25	3 4
Plymouth,—W. C...........	4	25	5	100	3	0	0	50	5	0	0	100	2	0	0	0	0	0	0				
Pontiac,—W. G. E..........	4	0	0	100	1	0	0	100	3	0	0	100	1	100	3	0	0	0	0				
Pontiac,—*R. LeB.*..........	4	100	1	100	2	0	0	100	5	0	0	100	4	0	0	0	0	0	0				
Pontiac,—J. P. W.	4	50	4	0	0	0	0	0	0	0	0	100	2	25	5	0	0	0	0				
Utica,—W. B..............*gg*	4	25	8	100	1	0	0	25	9	0	0	100	5	0	0	0	0	0	0	*gg*	Indigestion .... Tonsilitis............	100 100	4 5
Walled Lake,—E. A. C.....	4	75	1	25	1	0	0	0	0	0	0	25	4	0	0	0	0	0	0				
Wyandotte,—E. P. C....*hh*	4	0	0	0	0	0	0	0	0	0	0	100	3	50	3	0	0	100	4	*hh*	Diphtheritic tonsilitis............	25	2
Wyandotte,—*T. J. L.*......	4	0	0	0	0	0	0	100	3	0	0	100	6	50	7	0	0	0	0				

NOTE.—For comments on this table, see pages 256–7, 261, 263; for full headings, see pages 288, 289; for other references see page 283.

* Health Officer and Correspondent. † For counties in each division, see Exhibit 1, page 113.

§ The disease of which there were the most cases was to be marked 1 in order, on the cards; that of which there was the next greatest number, 2; and so on. Diseases not prevalent were to be marked 0. This column states the av. order of prevalence only for those weeks the disease was reported present.

‖ The numbers in this line are statements not for all the localities represented, but for those in which the disease was reported present.

a, *b*, *c*, etc. These letters refer across the page, from the names of Observers to statements concerning the amount of sickness, and relative to diseases reported by them in addition to those printed on the postal blanks.

TABLE 3—CONTINUED.—*By Localities and by Months, for the Three Months ending with December, 1877, Facts relative to the Occurrence and Order of Prevalence of Diseases in Michigan, as Compiled from Weekly Reports by Health Officers of Cities, and by Regular Correspondents of this Board,—stating, for each Disease, the Per Cent of Weeks Reported Prevalent Where Prevalent, and the Average Order of Prevalence When Prevalent, thus indicating the Prevalence as regards Time, and also as regards Area, so far as this is represented by the localities.*
For the Four Weeks ending **December** *29, 1877.*

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *.)	No. of Reports Rec'd.	Bronchitis.		Cerebro-spinal Meningitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid, (Enteric).	
		Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§	Per Cent of Wks. Prev.‡	Av. Order of Prevalence.§
ALL LOCALITIES‖	295	85	3	40	6	33	7	38	4	89	5	56	5	63	5	72	5	50	6	62	6	90	2	81	3	63	6
UPPER-PENINSULAR DIVISION.†																											
Calumet, Charles W. Niles	4	50	7	----	----	25	7	75	7	----	----	----	----	25	8	100	4	25	5	100	7	----	----	100	2	----	----
Houghton, H. W. Jones	4	100	2	----	----	----	----	----	----	100	6	----	----	----	----	----	----	----	----	----	----	----	----	75	5	----	----
Marquette, *Geo. J. Northrop**	4	100	1	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH-EASTERN DIVISION.†																											
Alpena, Wm. P. Maiden	4	100	1	0	0	0	0	0	0	0	0	0	0	100	2	25	2	0	0	0	0	0	0	50	1	0	0
WESTERN DIVISION.†																											
Grand Haven, *A. Vander Veen*	4	50	4	0	0	25	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	25	6
Grand Rapids, A. Hazlewood	4	25	6	0	0	0	0	0	0	100	5	0	0	50	6	0	0	0	0	0	0	100	2	100	1	0	0
Holland, *B. Ledeboer*	4	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2	----	----	25	3	0	0
CENTRAL DIVISION.†																											
Charlotte, *G. B. Allen**	4	100	2	0	0	0	0	0	0	100	10	0	0	0	0	100	5	0	0	25	10	100	4	100	7	100	9
Charlotte and vicinity, G. B. Allen.	4	100	3	0	0	0	0	0	0	100	11	0	0	0	0	100	7	0	0	75	10	100	3	100	6	100	9
DeWitt, G. W. Topping	4	100	1	0	0	0	0	0	0	0	0	0	0	75	4	0	0	25	4	0	0	50	3	25	4	25	3
Elsie, E. V. Chase	4	0	0	0	0	0	0	0	0	0	0	0	0	100	4	25	5	0	0	0	0	50	3	100	3	0	0
Flint, H. P. Seymour	3	100	4	0	0	0	0	0	0	67	6	33	6	100	3	100	4	33	7	100	5	100	3	67	4	0	0
Hastings, A. P. Drake	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0
Howell, C. V. Beebe	4	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	50	4	25	4	0	0
Hubbardston, H. W. Browne	4	100	4	0	0	0	0	0	0	100	8	0	0	0	0	0	0	0	0	0	0	100	2	100	2	100	4
Lansing, J. B. Hull	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	1	----	----
Lyons, D. C. Spalding	4	100	5	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	----	----	100	4	0	0	0	0
Mason, *H. Henry Cook*	4	50	2	0	0	0	0	0	0	25	2	75	2	0	0	0	0	0	0	0	0	100	2	75	1	0	0
North Lansing, O. Marshall	4	100	3	0	0	0	0	0	0	100	1	0	0	25	3	0	0	0	0	0	0	75	2	0	0	100	2
Otisville, A. W. Nicholson	4	75	2	0	0	0	0	0	0	100	2	50	3	75	2	0	0	0	0	0	0	75	3	0	0	0	0
Ovid, O. B. Campbell	4	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0
NORTHERN-CENTRAL DIVISION.†																											
Big Rapids, *W. S. Whitney*	4	25	3	0	0	0	0	0	0	0	0	0	0	0	0	75	4	0	0	75	5	100	3	50	3	0	0
BAY AND EASTERN DIVISION.†																											
Bay City, W. H. Burr	4	100	5	0	0	0	0	0	0	100	5	25	7	0	0	0	0	0	0	0	0	100	1	100	2	0	0
Bay City, W. R. Marsh	4	100	5	0	0	0	0	0	0	100	5	100	3	100	5	100	5	0	0	50	9	100	1	100	3	0	0
East Saginaw, Nelson H. Claflin	4	100	2	0	0	0	0	0	0	100	6	0	0	0	0	50	6	0	0	0	0	100	2	0	0	0	0
East Saginaw, Samuel Kitchen	4	100	2	0	0	0	0	0	0	100	8	0	0	25	5	100	7	0	0	0	0	100	3	100	2	25	9
East Saginaw, *M. J. Liddell*	4	50	4	0	0	0	0	25	3	25	4	0	0	0	0	25	8	50	3	25	4	100	1	50	2	0	0
Lapeer, *H. McColl*	3	100	2	0	0	0	0	0	0	0	0	33	4	33	4	33	3	0	0	0	0	100	2	0	0	0	0
Lexington, A. M. Oldfield	4	100	1	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	25	5	0	0	0	0	0	0

Port Huron, H. R. Mills	4	50	3	0	0	0	0	0	0	0	0	0	0	50	3	25	1	0	0	25	3	25	1	0	0	0	0
Port Huron, *A. A. Whitney*	4	100	2	0	0	0	0	25	8	100	5	50	5	75	7	0	0	0	0	0	0	100	4	0	0	0	0
Port Sanilac, J. M. Loop	4	----	----	----	----	----	----	----	----	----	----	25	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Saginaw, *N. D. Lee*	4	100	3	50	8	0	0	0	0	100	5	50	6	100	7	0	0	0	0	25	7	100	1	0	0	0	0
Saint Clair, *C. G. Robertson*	4	50	4	----	----	----	----	----	----	----	----	----	----	----	----	75	3	----	----	----	----	100	2	100	1	0	0
Thornville, John S. Caulkins	4	100	4	0	0	0	0	0	0	100	7	0	0	25	5	50	5	0	0	0	0	100	1	75	4	0	0
West Bay City, I. E. Randall	4	100	5	0	0	0	0	0	0	100	4	25	5	100	5	0	0	25	5	0	0	100	1	100	3	0	0
SOUTH-WESTERN DIVISION.†																											
Allegan, H. S. Lay	3	100	1	0	0	0	0	0	0	67	5	0	0	33	5	0	0	0	0	33	6	67	2	33	4	0	0
Benton Harbor, John Bell	2	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
Dowagiac, *H. S. McMaster*	4	100	6	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	3	100	2	0	0
Mattawan, Thos. H. Briggs	4	100	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	3	100	2	0	0
Niles, Simeon Belknap	3	100	6	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	100	6	100	4	100	3	100	5
Niles, James S. Reeves	4	100	4	----	----	----	----	25	7	100	5	----	----	----	----	----	----	----	----	----	----	100	1	100	2	50	6
Otsego, Milton Chase	4	100	1	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	25	1	75	2	0	0
Paw Paw, J. Andrews	4	50	2	0	0	0	0	25	2	100	2	0	0	0	0	50	3	0	0	25	2	100	1	50	1	0	0
Saint Joseph, R. F. Stratton	4	100	1	----	----	----	----	----	----	----	----	----	----	50	4	----	----	----	----	----	----	50	2	50	3	----	----
SOUTHERN-CENTRAL DIVISION.†																											
Adrian, Robert Stephenson	4	75	2	0	0	0	0	0	0	100	2	0	0	25	2	0	0	0	0	0	0	100	1	0	0	0	0
Albion, John P. Stoddard	4	100	3	0	0	0	0	0	0	100	4	0	0	0	0	100	5	75	6	100	7	100	2	100	2	0	0
Ann Arbor, W. F. Breakey	4	100	5	0	0	0	0	0	0	100	7	0	0	0	0	50	3	25	4	0	0	100	4	100	2	25	6
Brooklyn, E. N. Palmer	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	2	25	2
Clinton, A. W. Alvord	3	33	5	67	8	0	0	0	0	100	7	0	0	67	4	0	0	33	6	33	6	33	3	100	1	0	0
Coldwater, *Louis H. Wurtz**	4	100	2	0	0	0	0	0	0	75	4	0	0	0	0	0	0	0	0	0	0	100	4	100	4	0	0
Hudson, A. R. Smart	4	100	3	0	0	0	0	0	0	50	7	0	0	0	0	50	4	0	0	0	0	100	2	100	3	0	0
Jackson (State Prison), Edwin L. Kimball	4	100	1	----	----	----	----	----	----	100	5	----	----	----	----	75	6	----	----	100	7	100	2	----	----	25	9
Kalamazoo, W. B. Southard	4	0	0	0	0	0	0	0	0	100	5	0	0	50	4	0	0	0	0	0	0	100	1	100	3	0	0
Marshall, *H. L. Joy.**	2	100	1	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	50	6	100	5	0	0
Mendon, H. C. Clapp	4	100	1	0	0	0	0	0	0	25	7	0	0	0	0	0	0	0	0	0	0	100	3	100	4	0	0
Mendon, Edwin Stewart	4	100	2	0	0	0	0	0	0	25	4	0	0	0	0	0	0	0	0	0	0	100	1	75	3	0	0
Sturgis, Nelson I. Packard	4	50	4	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	1	50	3	0	0
Tecumseh, C. M. Woodward	4	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
Three Rivers, C. W. Backus	4	100	5	0	0	0	0	0	0	100	9	0	0	0	0	100	7	0	0	75	8	100	1	100	4	0	0
York, F. M. Oakley	4	75	2	0	0	0	0	25	2	100	1	0	0	25	2	0	0	0	0	0	0	75	2	0	0	75	2
Ypsilanti, *Edward Batwell**	4	25	2	25	4	0	0	0	0	25	4	0	0	25	1	0	0	0	0	0	0	75	2	25	2	25	2
SOUTH-EASTERN DIVISION.†																											
Dearborn, E. S. Snow	2	50	1	50	6	0	0	0	0	0	0	50	2	0	0	0	0	0	0	0	0	100	4	50	2	0	0
Detroit, Leartus Connor	4	100	2	0	0	0	0	0	0	100	5	0	0	100	12	100	14	100	13	100	11	100	3	100	7	25	15
Detroit, *E. Leach*	2	100	4	----	----	----	----	100	1	100	2	100	2	----	----	----	----	100	2	----	----	100	8	50	1	100	5
Detroit, W. H. Rouse	4	100	2	0	0	0	0	0	0	100	8	100	15	100	7	100	12	100	14	100	13	100	10	100	6	100	11
Milford, Robert Johnston	4	100	2	0	0	0	0	0	0	75	4	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
Monroe, *Edward Dorsch*	4	100	3	0	0	50	6	0	0	100	4	100	4	100	2	100	6	0	0	0	0	100	1	100	3	100	5
Monroe, W. C. West	2	100	3	0	0	0	0	0	0	----	----	0	0	0	0	0	0	0	0	----	----	100	1	100	2	0	0
Northville, J. M. Swift	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plymouth, Willard Chaney	4	100	1	0	0	0	0	0	0	0	0	0	0	75	6	0	0	0	0	0	0	75	5	0	0	0	0
Pontiac, W. G. Elliott	4	100	1	25	4	0	0	0	0	100	6	0	0	75	5	100	3	0	0	0	0	100	3	0	0	100	4
Pontiac, *R. LeBaron*	3	100	7	33	7	0	0	0	0	100	8	0	0	100	6	0	0	0	0	100	5	100	1	100	1	100	3
Pontiac, John P. Wilson	3	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	67	4
Utica, Wm. Brownell	4	75	6	0	0	0	0	0	0	100	7	25	6	25	7	0	0	0	0	0	0	0	0	100	5	0	0
Walled Lake, E. A. Chapman	4	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	1	50	2	75	3
Wyandotte, E. P. Christian	4	100	2	0	0	0	0	0	0	100	3	0	0	100	2	50	3	25	2	0	0	0	0	25	2	0	0
Wyandotte, *T. J. Langlois*	4	100	1	0	0	0	0	0	0	25	5	0	0	25	4	0	0	0	0	0	0	100	4	0	0	0	0

*, †, ‡, §, ‖ For explanations and references, see foot-notes on pages 283, 285; for comments, see pages 256-7, 261, 263.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **December** *29, 1877.*—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED, AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *. For full names of Observers and Divisions, see pages 286-7.)	No. of Reports Rec'd.	Fever, Typho-malarial.		Influenza.		Measles.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Whooping-cough.	
		Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§	Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§	Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§	Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§	Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§	Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§	Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§	Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§	Per Ct. of Wks. Prevalent.‡	Av. Order of Prevalence.§
ALL LOCALITIES‖	295	74	5	83	3	88	5	75	4	38	5	87	4	71	4	0	0	70	5
UPPER-PENIN. DIV.†																			
Calumet,—C. W. N.	4	----	----	----	----	100	1	100	7	75	7	100	6	100	4	----	----	100	3
Houghton,—H. W. J. *a*	4	----	----	50	4	100	1	25	3	----	----	50	6	----	----	----	----	100	4
Marquette,—*G. J. N.** *b*	4	100	3	100	1	0	0	0	0	0	0	100	3	0	0	0	0	100	5
NORTH-EASTERN DIV.†																			
Alpena,—W. P. M. *c*	4	0	0	0	0	0	0	0	0	0	0	100	2	25	2	0	0	0	0
WESTERN DIVISION.†																			
Grand Haven,—*A. V.*	4	25	5	100	2	0	0	100	3	0	0	75	4	0	0	0	0	0	0
Grand Rapids,—A. H. *d*	4	0	0	100	4	0	0	0	0	25	5	100	4	0	0	0	0	0	0
Holland,—*B. L.* *e*	4	0	0	100	2	0	0	100	3	0	0	25	3	0	0	0	0	0	0
CENTRAL DIVISION.†																			
Charlotte,—*G. B. A.**	4	100	8	100	2	0	0	75	7	0	0	100	4	0	0	0	0	0	0
Charlotte and vic.,—G. B. A.	4	100	7	100	4	0	0	100	8	0	0	100	1	0	0	0	0	25	10
DeWitt,—G. W. T. *f*	4	0	0	0	0	0	0	50	3	0	0	100	2	0	0	0	0	0	0
Elsie,—E. V. C. *g*	4	100	1	0	0	0	0	75	4	0	0	0	0	50	5	0	0	0	0
Flint,—H. P. S. *h*	3	67	6	100	2	0	0	100	6	0	0	100	3	0	0	0	0	33	5
Hastings,—A. P. D.	4	0	0	100	1	0	0	25	4	0	0	0	0	0	0	0	0	0	0
Howell,—C. V. B. *i*	4	25	7	100	1	0	0	25	2	25	6	100	3	0	0	0	0	0	0
Hubbardston,—H. W. B. *j*	4	0	0	100	5	0	0	0	0	0	0	100	6	0	0	0	0	100	9
Lansing,—J. B. H.	4	----	----	----	----	----	----	----	----	----	----	25	1	----	----	----	----	----	----
Lyons,—D. C. S.	4	25	4	75	2	0	0	100	1	0	0	100	5	0	0	0	0	0	0
Mason,—*H. H. C.*	4	0	0	0	0	0	0	50	2	25	2	75	1	0	0	0	0	0	0
North Lansing,—O. M. *k*	4	0	0	0	0	0	0	75	3	0	0	50	4	25	3	0	0	0	0
Otisville,—A. W. N.	4	0	0	25	3	0	0	0	0	0	0	25	3	0	0	0	0	0	0
Ovid,—O. B. C.	4	0	0	100	2	0	0	0	0	0	0	0	0	75	3	0	0	0	0
N. CENTRAL DIV.†																			
Big Rapids,—*W. S. W.*	4	75	1	100	4	0	0	0	0	0	0	100	6	0	0	0	0	0	0
BAY AND EASTERN DIV.†																			
Bay City,—W. H. B.	4	50	6	100	3	0	0	100	6	0	0	100	4	0	0	0	0	0	0
Bay City,—W. R. M. *l*	4	100	6	100	3	0	0	100	4	0	0	100	3	0	0	0	0	0	0
East Saginaw,—N. H. C.	4	50	3	0	0	0	0	100	6	0	0	50	5	0	0	0	0	50	4
East Saginaw,—S. K. *m*	4	75	6	25	10	0	0	75	7	0	0	100	4	0	0	0	0	75	6
East Saginaw,—*M. J. L.* *n*	4	0	0	25	4	0	0	0	0	0	0	100	4	0	0	0	0	0	0
Lapeer,—*H. McC.* *o*	3	0	0	0	0	0	0	67	5	0	0	100	4	100	3	0	0	0	0
Lexington,—A. M. O.	4	0	0	100	3	0	0	100	2	0	0	50	5	0	0	0	0	0	0
Port Huron,—H. R. M.	4	0	0	0	0	0	0	75	2	0	0	0	0	0	0	0	0	0	0
Port Huron,—*A. A. W.*	4	25	5	100	3	50	8	25	6	0	0	75	8	100	2	0	0	0	0
Port Sanilac,—J. M. L. *p*	4	----	----	----	----	----	----	50	1	----	----	----	----	----	----	----	----	----	----
Saginaw,—*N. D. L.* *q*	4	100	7	0	0	0	0	100	4	0	0	100	2	0	0	0	0	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC.	Per Cent of Weeks Prevalent.‡	Av. Order of Prevalence when Prevalent.§
a	Croup	25	4
	Rheumatism mostly chronic cases, Dec. 22.		
b	Tonsilitis	100	2
	Ophthalmia	100	6
c	Cystorrhœa, nephritis, and orchitis, each	50	2
d	Cold and raw, Dec. 8; mild, Dec. 15; foggy and murky, Dec. 23; cloudy, murky, and warm, Dec. 29.		
e	Bilious intermittent fever	25	2
	Bilious colic, and bilious remittent fever, each	50	2
	Jaundice	75	3
f	Abortion, colic, and jaundice, each	25	4
	Leucorrhea	50	2
	Pharyngitis	100	2
	Scrofula and scrofulous abscess, each	25	4
	Waxy liver	75	4
g	Albuminuria	25	3
h	Mumps	33	4
	Tonsilitis	67	3
i	Little sickness, Dec. 15.		
j	Catarrh	24	4
k	Hepatitis and laryngitis, each	25	3
	Pelvic cellulitis, pericarditis, and tonsilitis, each	50	3
l	Only accidental sickness	75	
	See note "*l*" for Dec., on page 290.		
m	Apoplexy	25	8
	Epilepsy	25	10
	See note "*m*" for Dec., on page 290.		
n	Anemia	100	3
	Apthæ	75	4
	Cystitis	50	4
	Glossitis, metrilis, and vertigo, each	25	4
	Hepatitis and tonsilitis, each	25	5
	Scrofula	25	3

Saint Clair,—*C. G. R.*......*r*	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thornville,—J. S. C........*s*	4	100	2	25	5	0	0	50	5	0	0	100	6	0	0	0	0	0	0
West Bay City,—I. E. R.....	4	100	3	75	5	0	0	25	6	0	0	100	5	0	0	0	0	25	6
SOUTH-WESTERN DIV.†																			
Allegan,—H. S. L..............	3	0	0	0	0	0	0	100	3	0	0	100	3	0	0	0	0	0	0
Benton Harbor,—J. B.......*t*	2	0	0	100	3	0	0	0	0	0	0	0	0	50	4	0	0	0	0
Dowagiac,—*H. & McM.*....*u*	4	100	2	100	5	0	0	100	5	0	0	100	6	0	0	0	0	0	0
Mattawan,—T. H. B.........*v*	4	0	0	100	2	----	----	0	0	0	0	100	2	0	0	0	0	0	0
Niles,—S. B..................	3	0	0	100	1	0	0	100	4	0	0	100	9	0	0	0	0	0	0
Niles,—J. S. R...............*w*	4	----	----	----	----	----	----	50	6	----	----	100	4	----	----	----	----	----	----
Otsego,—M. C.................*x*	4	75	5	75	3	0	0	25	7	0	0	100	4	0	0	0	0	0	0
Paw Paw,—J. A...............*y*	4	0	0	0	0	0	0	0	0	0	0	100	2	50	1	0	0	25	3
Saint Joseph,—R. F. S......*z*	4	----	----	----	----	----	----	----	----	----	----	50	1	----	----	----	----	----	----
SOUTH'N-CENTRAL DIV.†																			
Adrian,—R. S..................	4	50	2	0	0	0	0	0	0	0	0	0	0	75	2	0	0	0	0
Albion,—J. P. S. ....*aa*	4	0	0	100	1	0	0	100	6	0	0	100	4	100	4	0	0	0	0
Ann Arbor,—W. F. B.........	4	75	5	75	4	0	0	25	3	0	0	100	5	0	0	0	0	0	0
Brooklyn,—E. N. P...........	4	0	0	0	0	0	0	75	2	0	0	0	0	50	1	0	0	0	0
Clinton,—A. W. A............	3	100	5	33	2	0	0	100	5	0	0	100	4	0	0	0	0	0	0
Coldwater,—*L. H. W.**...*bb*	4	100	5	0	0	0	0	100	4	0	0	100	2	0	0	0	0	0	0
Hudson,—A. R. S.,..........*cc*	4	0	0	100	2	0	0	100	3	0	0	100	3	100	6	0	0	0	0
Jackson (State Pris.)E. L. K. *dd*	4	----	----	----	----	----	----	----	----	----	----	100	4	----	----	----	----	----	----
Kalamazoo,—W. B. S.........	4	100	3	0	0	0	0	0	0	0	0	0	0	50	5	0	0	0	0
Marshall, *H. L. J.**...........	2	0	0	100	3	0	0	100	4	0	0	100	8	0	0	0	0	0	0
Mendon,—H. C. C...........*ee*	4	25	6	0	0	0	0	100	3	0	0	100	4	0	0	0	0	0	0
Mendon,—E. S................	4	50	4	75	3	0	0	25	4	0	0	75	4	0	0	0	0	0	0
Sturgis,—N. I. P..............	4	0	0	0	0	0	0	100	3	0	0	75	5	0	0	0	0	0	0
Tecumseh,—C. M. W.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Three Rivers,—C. W. B..*ff*	4	0	0	100	7	0	0	100	4	0	0	100	6	75	7	0	0	75	4
York,—F. M. O. ....*gg*	4	0	0	0	0	0	0	0	0	0	0	75	2	0	0	0	0	0	0
Ypsilanti,—*E. B.**.........*hh*	4	75	1	0	0	0	0	25	4	0	0	50	3	0	0	0	0	0	0
SOUTH-EASTERN DIV.†																			
Dearborn,—E. S. S............	2	0	0	100	3	0	0	50	3	0	0	100	5	0	0	0	0	0	0
Detroit,—L. C..................	4	100	8	100	4	100	10	100	12	0	0	100	4	100	7	0	0	100	10
Detroit,—*E. L.*..................	2	100	1	----	----	----	----	50	1	----	----	100	1	50	5	----	----	100	8
Detroit,—W. H. R. ....*ii*	4	100	16	100	3	0	0	100	4	0	0	100	7	100	9	0	0	100	2
Milford,—R. J..................	4	0	0	25	4	0	0	75	4	----	----	100	3	0	0	0	0	0	0
Monroe,—*E. D.*...............*jj*	4	100	4	100	3	0	0	100	3	0	0	100	3	0	0	0	0	100	5
Monroe,—W. C. W............	2	50	3	0	0	0	0	0	0	0	0	50	8	0	0	0	0	0	0
Northville,—J. M. S. ....*kk*	4	0	0	50	1	0	0	25	3	0	0	100	1	0	0	0	0	0	0
Plymouth,—W. C..............	4	0	0	75	3	0	0	50	2	0	0	100	3	0	0	0	0	0	0
Pontiac,—W. G. E............	4	0	0	100	2	0	0	100	3	0	0	100	1	75	4	0	0	0	0
Pontiac,—*R. LeB.*............	3	100	2	100	4	0	0	100	6	0	0	100	4	0	0	0	0	0	0
Pontiac,—J. P. W.............	3	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
Utica,—W. B.................*ll*	4	0	0	100	1	0	0	0	0	0	0	100	4	0	0	0	0	0	0
Walled Lake,—E. A. C......	4	0	0	0	0	0	0	75	4	0	0	25	3	0	0	0	0	0	0
Wyandotte,—E. P. C........	4	25	3	25	3	0	0	0	0	0	0	75	2	50	2	0	0	25	3
Wyandotte,—*T. J. L.*.........	4	0	0	0	0	0	0	100	2	0	0	100	4	0	0	0	0	0	0

o	**Scarlatina mild and all from one family, Dec. 8.**		
p	**No diseases of any kind, Dec. 29.**		
q	**Neuralgia**	100	1
r	**Cynanche tonsillaris and pleuritis,** each................................	25	4
	Very healthy	50	
s	Enteritis, two cases, Dec. 22.		
t	Asthma................	50	6
	Neuralgia........................	100	5
	More consumption during last 2 years than for 13 years before; within the last 6 months nearly all have died, Dec. 17.		
u	Very little acute disease, two weeks ending Dec. 22.		
v	Bright's disease........	25	4
	Myelitis................	100	2
w	See note "*w*" for Dec., on page 290.		
x	About an average amount of sickness, Dec. 8. More sickness than a year ago, 3 weeks ending Dec. 29.		
y	Amenorrhœa	25	2
	Cancer of stomach..	100	2
	Epilepsy................................	50	2
	Fever, remittent (relapsing).........	25	2
	Gastritis, hæmaturia, and peritonitis, each................................	25	3
	Gastrodynia and myelitis, each	75	2
	Nephritis and tonsilitis, each........	25	2
z	Little sickness, Dec. 15.		
aa	Only one new case of scarlatina, week ending Dec. 8.		
	Pharyngitis................................	50	2
bb	Tonsilitis	100	1
cc	Perityphlitis, 3 cases, Dec. 22.		
dd	Tonsilitis................................	100	3
ee	Peritonitis, 1 case........................	25	6
ff	Catarrh................................	25	11
	Colic................................	50	8
	Dyspepsia................................	75	8
	Hysteria and scrofula, each........	25	10
	Very healthy................................	100	
gg	Albuminuria................................	25	2
hh	See note "*hh*" for Dec., on page 290.		
ii	Cystitis................................	25	17
	But little sickness........................	75	
	See note "*ii*" for Dec., on page 290.		
jj	Dropsy (malarial)........................	25	4
	Nephralgia and urticaria, each......	50	5
	Neuralgia and quinsy, each..........	100	4
kk	Bright's disease, 2 cases..................	25	3
ll	Indigestion................................	100	3
	Tonsilitis	100	2

*, †, ‡, §, ‖, *a, b, c,* etc. For explanations and references, see foot-notes on pages 283, 285; for comments, see pages 256-7, 261, 263.

NOTE.—Other reports of diseases in Michigan are given in "Special Reports and Communications to this Board," in the first part of this volume; also on pages 78-90 and 105-165.

For want of room on the same pages with the table, some of the longer side-notes to Table 3 are printed here. The reference letters before each note refer to the locality for which the note is a statement. The names of the localities, distinguished by the same letters, may be found in the first column of the table, on pages 280–281, for the October notes; on pages 284–285, for the November notes; and on pages 288–289, for the December notes. Additional remarks relative to some of the same localities may be found in the last column on the pages mentioned.

ADDITIONAL NOTES FOR OCTOBER.

w Scarlatina is *rather* increasing in frequency and severity, week ending Oct. 20. Scarlatina is evidently increasing in frequency, but not in intensity, week ending Oct. 27. Scarlatina slightly less frequent than last week, week ending Nov. 3.

cc Two fatal cases of dysentery in children two years old; one of pernicious or congestive intermittent, unconscious and speechless for 30 hours; some severe cases of diarrhea in children. The striking meteorological condition was low temperature and dampness, or slow evaporation,—Oct. 23.

dd Sickness abating; season for malarial diseases about expiring, Oct. 6. Not much sickness, Oct, 13. Sickness still abating; very healthy this month, Oct. 20. Health of the community very good, Oct. 27. Colds and irritative fever therefrom more prevalent, week ending Nov. 3.

ff More cases of scarlatina reported, generally of a very mild type, week ending Oct. 20. A few more cases of rheumatism, Oct. 27. Fevers of asthenic type, Nov. 3.

hh Not much sickness, but continued and typhoid types of fever where there is anything worth reporting, Oct. 13. Mild types, in all; rain! rain!—Oct. 20.

ADDITIONAL NOTES FOR NOVEMBER.

c Weather variable, snow and sleet and colder, Nov. 10. Cloudy, temperature moderate, Nov. 17. Cloudy with rain and snow; moderate, Nov. 24. Cloudy and rainy; later, cold and snow, Dec. 1.

n Diphtheria some 14 miles west, in townships of Speaker and Fremont, Nov. 15.

s Fevers on the increase, week ending Nov. 10. Quite healthy, two weeks ending Nov. 24. Some increase of sickness, mostly lung troubles, week ending Dec. 1.

t About an average amount of sickness, Nov. 17. More sickness than the average, Dec. 1.

v Scarlatina less frequent, Nov. 10. Scarlatina rather more frequent, but mild; in 70 cases only two deaths yet, Nov. 17. But one or two new cases of scarlatina, Nov. 24. One more death from scarlatina, Dec. 1.

aa Sickness increased on account of cold and wet weather and great changes in temperature, week ending Nov. 10. Not much sickness for this season of the year, Nov. 17. Continues healthy two weeks ending Dec. 1.

ADDITIONAL NOTES FOR DECEMBER.

l Less fatal sickness than we have had for a long time; cases of many diseases; no one prevails except climatic or miasmatic symptoms, Dec. 8. Fewer interments at the cemetery the last month than any week within the last 3 years, week ending Dec. 22.

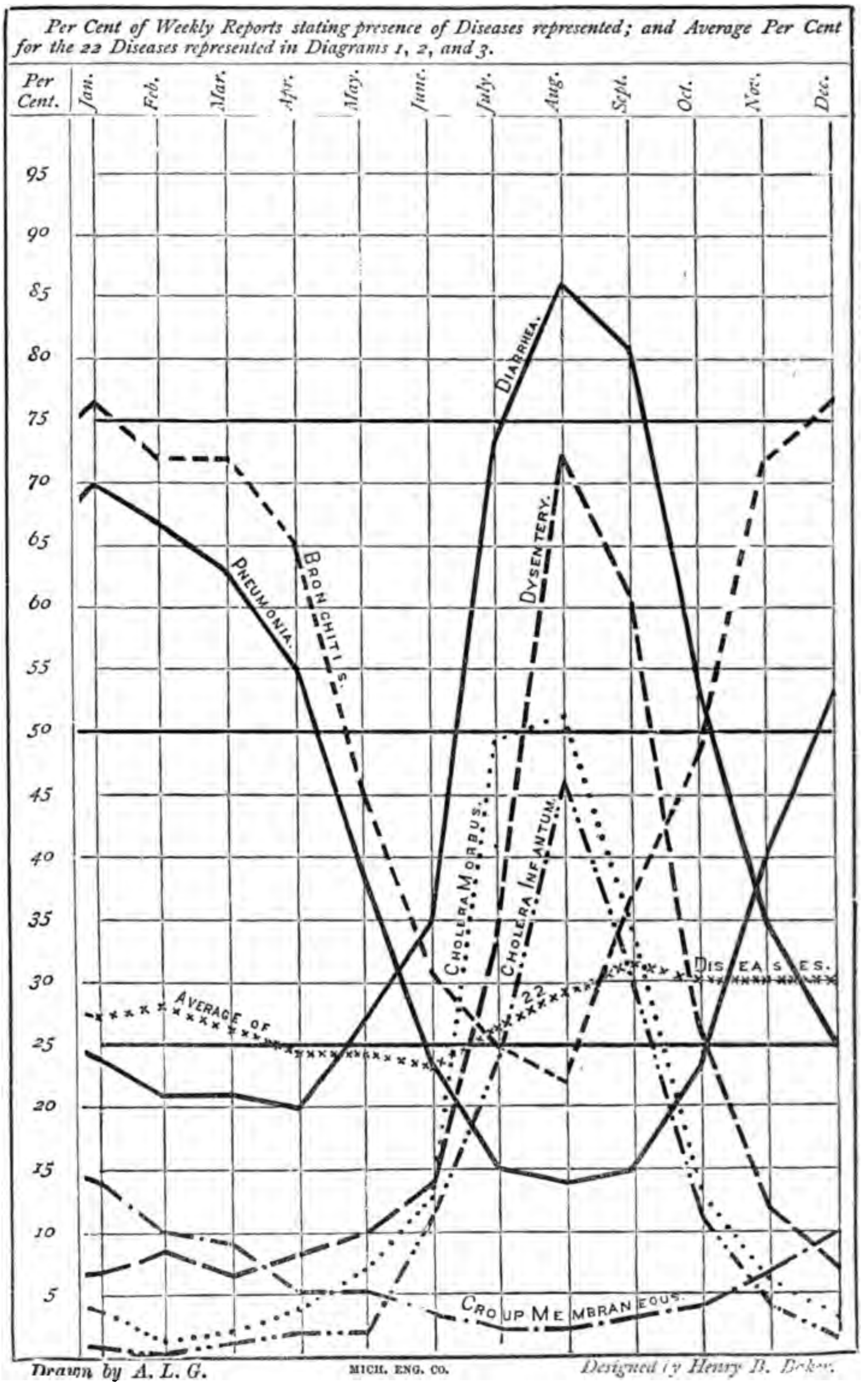
m Increase of throat and lung diseases; malarial diseases tend to remittent type and are accompanied by more than usual gastric disturbance, Dec. 29.

w Increase in ozone about Nov. 1; about Nov. 1 it became very healthy; much damp air, but no disturbance of the health. The fevers have all been of a very mild character, but very persistent, Jan. 1, 1878.

hh Decided tendency to cerebral disease, Dec. 15; in 2 typhoid fever cases, well-marked cerebro-spinal meningitis occurred, fatal in one of them, Dec. 16. Very little illness, Dec. 29.

ii Considerable increase of whooping-cough, week ending Dec. 8. Whooping-cough becoming prevalent, week ending Dec. 15. Much is said about diphtheria; but I believe that the term is extensively used for effect: in a company of eleven physicians the other evening, I found, on inquiry, that not one had seen a case lately.—Dec. 29.

DIAGRAM No. 1.—DISEASES IN MICHIGAN, BY MONTHS IN 1877.



Per Cent of Weekly Reports stating presence of Diseases represented; and Average Per Cent for the 22 Diseases represented in Diagrams 1, 2, and 3.

Drawn by A. L. G. MICH. ENG. CO. Designed by Henry B. Baker.

DIAGRAMS.

In order to group for more convenient study some of the more important statements of the preceding tables, relative to diseases, and facilitate comparison of statements concerning the prevalence of diseases in each month of the year 1877 with statements of meteorological conditions for the same periods of time, three diagrams have been prepared, which represent graphically the statements given in the fifth column of Table 2—headed "Per Cent of Reports Stating Prevalence of"—on pages 264–267. Diagrams representing leading meteorological conditions for the same time are given on pages 221, 230, 233, 237, 241, 243, and 248, of this Report.

In connection with these diagrams of diseases, mention should be made of two charts, or diagrams, of diseases in Massachusetts during the year 1875, illustrating the weekly course of many of the diseases here studied, which charts were published by F. W. Draper, M. D., of Boston, Mass., in a "Report on the Registration of Prevalent Diseases," in the Seventh Annual Report of the Massachusetts State Board of Health, for 1876.

CONSTRUCTION AND READING OF THE DIAGRAMS.

For the benefit of any who may not be familiar with this particular method of forming diagrams, it may be stated that each month is represented by a perpendicular line placed directly under the name of the month; that the different diseases studied are represented by different kinds of lines running across the diagram from left to right; and that the course which each line takes and the distance of the line up from the bottom indicates, for each month, the per cent which the weekly reports which stated the presence of the disease are of all weekly reports received. The diagrams are accurately "drawn to scale," so that the distance up from the bottom is in proportion to the increase in per cent; and the per cent is stated in the left-hand column for the level of each horizontal line opposite the figures stating the per cent; therefore the per cent for each disease for each month is learned by noting at what level the line representing the disease crosses the line representing the month, and reading from the left-hand column the per cent for that level, or for the line which runs nearest to that level and then estimating the difference.

COMPARISON OF DIAGRAMS.

In planning the diagrams, in this volume, which relate to diseases and to meteorological conditions at the same time, the writer has acted upon a principle which seems to be important, and which, not having seen it stated, he mentions, as follows: For each of the diseases tabulated, the statements in the tables and the graphic exhibits in the diagrams represent, so far as the evidence goes, the extent of the disease for each month, and show in which months the maximum and minimum sickness from such diseases occur; we thus learn, approximately, the range of each of the diseases studied. If the increase or decrease of the sickness is due to any meteorological condition, there should be not only a general relation in time, between that meteorological condition and the disease, but there should be a quantitative relation,—the rise or fall of the line representing the disease should be in proportion either to the rise or to the fall of the line representing the meteorological condition.

In order to learn whether there is such a quantitative relation, it is desirable that the two diagrams, which exhibit the facts relative to the disease and relative to the meteorological condition, shall be upon the same scale; but how can there be one scale which shall exhibit facts of such entirely different character? It is believed, however, that the principle upon which these diagrams are constructed renders such diagrams comparable, quantitatively. It consists in making the range of the meteorological conditions occupy the same space as does the range of the disease. This is accomplished by placing the maximum and minimum for the meteorological conditions as nearly as is practicable the same distance apart. vertically, on the diagram as the maximum and minimum for the disease are placed. The vertical distance between these points represents the range, and if it is traversed by the line representing the conditions in one month or series of months, and by the line representing the disease in a month or series of months having no relation thereto, this will be apparent; if, on the other hand, the two lines run parallel to each other, or if one uniformly goes up when the other goes down, this also will be apparent. The diagrams being drawn to scale, and the spaces between the extremes the same in the two diagrams, if such relation between the conditions and the disease being studied is a uniform and a quantitative relation, the extent of the range from month to month in one diagram will, in each case, be in proportion to that in the other; and the course of the line in one diagram will correspond, directly or inversely, to the course of the line in the other diagram; the rise and fall of both, however, may not necessarily be coincident, because the effects of meteorological conditions in one month may be most apparent in sickness in the following month.

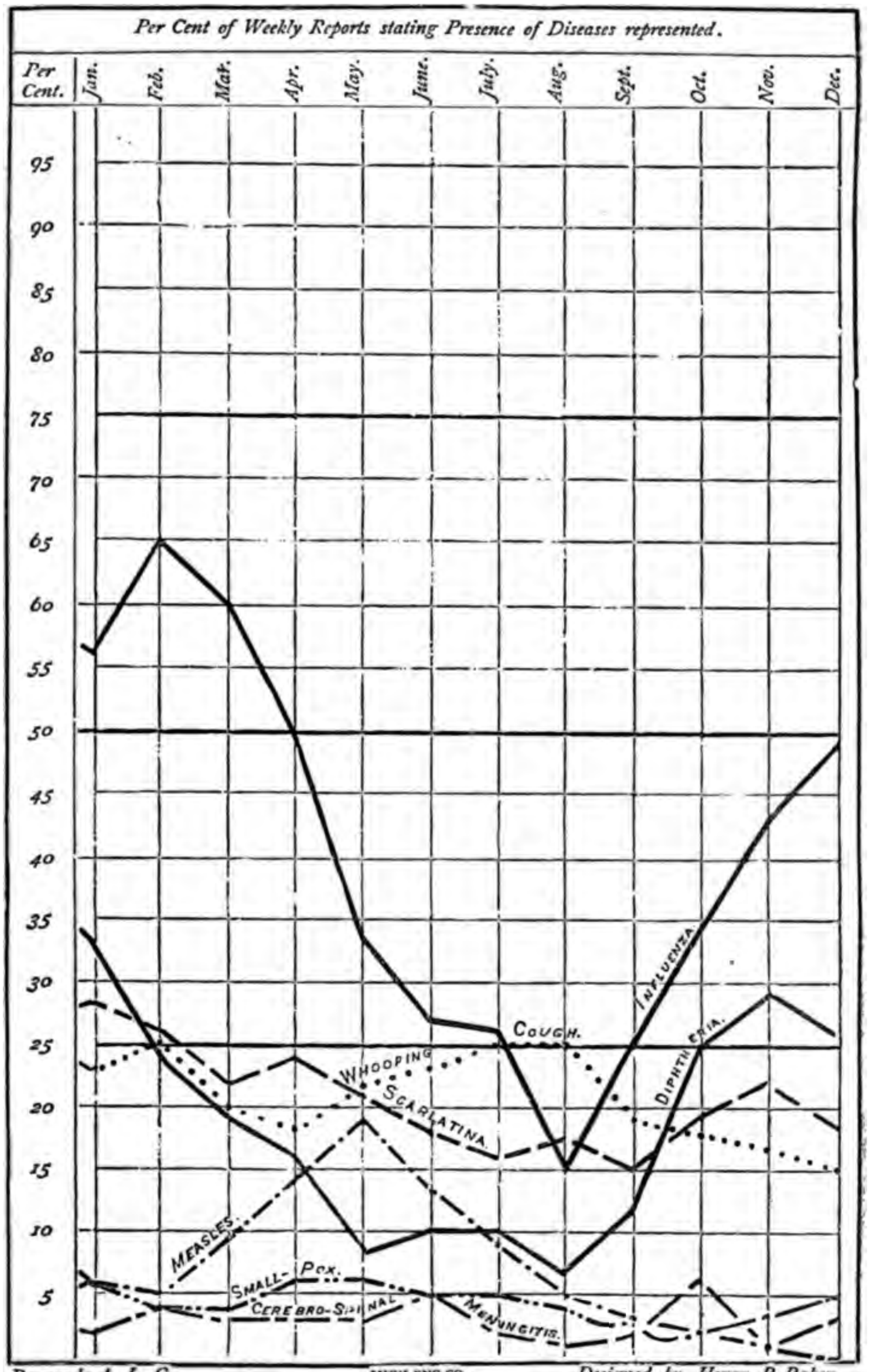
DIAGRAMS OF DISEASES IN MICHIGAN IN 1877.

The relations of the reported presence of the different diseases to the season of the year can easily be studied by means of the Diagrams 1, 2, and 3, pages 292, 295, 298; and many of the meteorological conditions in the different months of the year can be learned by looking at the Diagrams I.-VII., pages 221-248 of this volume. But much can be learned by a careful study of these three diagrams of diseases alone. It is especially interesting to observe the apparent relationships of the various diseases, and how easily many of them may be classified with reference to the seasons of the year in which they are most prevalent. This is particularly noticeable in Diagram 1, because of the great contrast there made between bronchitis, pneumonia, and croup—diseases most prevalent in cold and dry weather—and diarrhea, dysentery, cholera morbus, and cholera infantum—diseases most prevalent in warm and moist weather. If we can be assured of the correctness of the evidence on which it is based, this diagram very strongly portrays, by months of the year, some of the most important dangers to life and health, and thus supplies knowledge essential to the avoidance of those dangers. It is a very promising field for further investigation.

Exhibits 11 and 12, relating to croup and pneumonia, pages 302-305, should be studied in connection with Diagram 1, page 292.

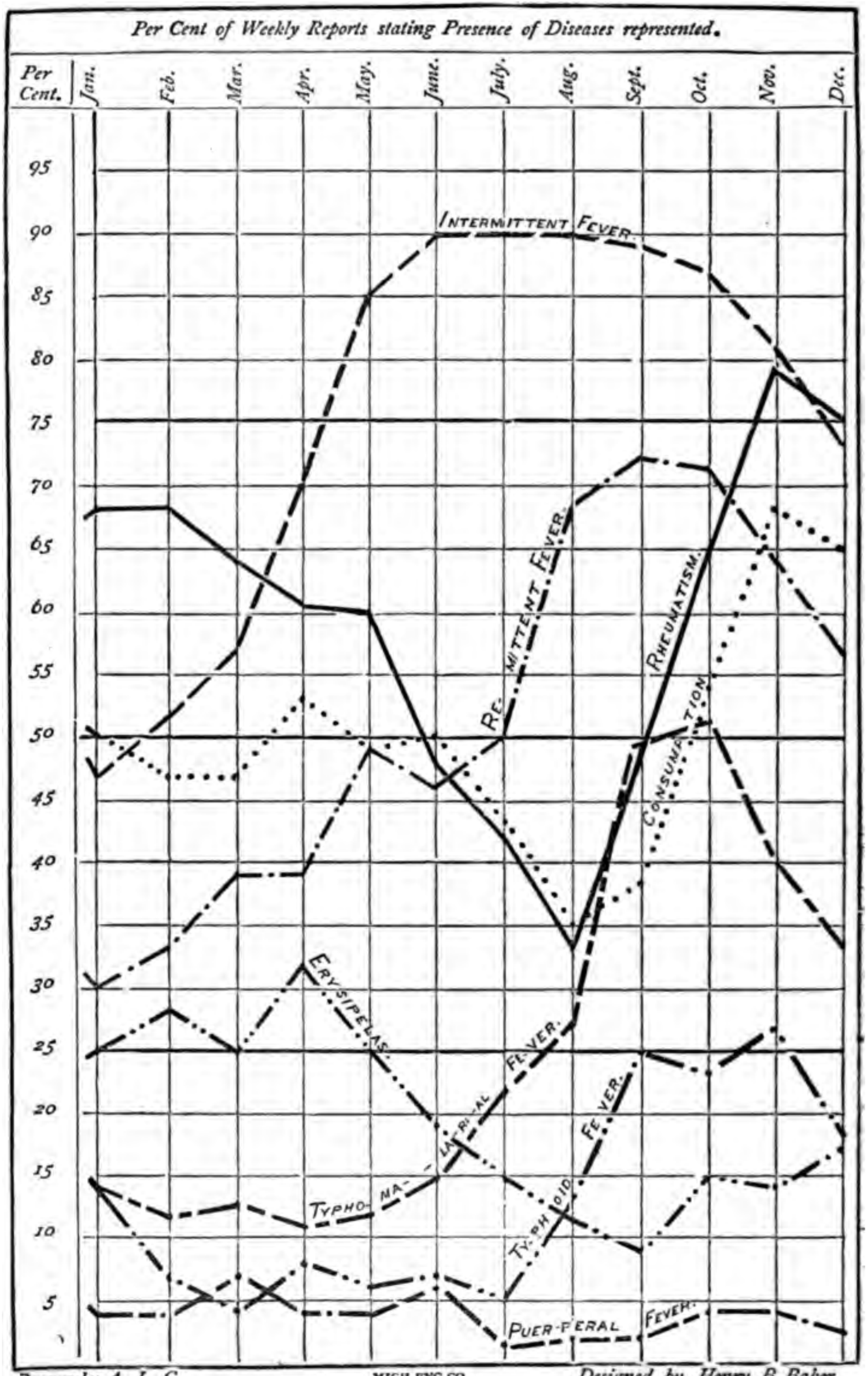
In Diagram 2, page 295, it appears that the influenza and diphtheria of 1877 bore a close relation to each other, and to the diseases of the air passages, graphically represented in Diagram 1.

DIAGRAM No. 2.—DISEASES IN MICHIGAN, BY MONTHS IN 1877.



Drawn by A. L. G. MICH. ENG. CO. Designed by Henry B. Baker.

DIAGRAM No. 3.—DISEASES IN MICHIGAN, BY MONTHS IN 1877.



Drawn by A. L. G. MICH.ENG.CO. *Designed by Henry B. Baker.*

Diagram 3 pictures one of the most interesting series of apparent relationships of diseases; namely, that of the group of fevers, which are there noticeable in an order about as follows: 1, intermittent fever, which prevailed least in the first months of the year, and most from May to October; 2, remittent fever, which seems to have been coincident with intermittent fever, except that it reached its maximum later in the year; 3, typho-malarial fever, coincident with both the preceding, except that it reached its maximum a little later even than did remittent fever; 4, typhoid fever, coincident, in a general way, with all the preceding, though reaching its maximum later than did intermittent or remittent fever, being most prevalent in September, October, and November. It is worthy of note that what is reported as typho-malarial fever occupies a place between typhoid fever and the so-called malarial fevers.

Intermittent fever may be further studied in connection with Exhibits 5 and 6, pages 122–123, and Exhibit 14, page 308.

According to the evidence in Diagram 3, rheumatism has relations to the diseases most prevalent in cold and dry weather. This subject can be further studied in connection with Exhibit 13, page 306.

It is not claimed as proved that the relations of these diseases and climatic conditions, mentioned in preceding paragraphs, are relations of causes and effects,—the study of the causes of diseases is a very difficult one; it is believed, however, that the study which is here entered upon, concerning the relations of diseases and climatic conditions, is an essential and important step in the study of the causation of diseases. Some methods of dealing with the subject have been suggested on pages 213–214 of this Report.

EXHIBITS 11-14,—DISEASES AND METEOROLOGICAL CONDITIONS.

In Exhibits 11, 12, 13, and 14, pages 302–309, the relations of certain diseases to certain meteorological conditions are studied in a manner similar to that adopted by the writer in his studies of the relations of deaths to meteorological conditions, which have been printed in the volumes on the Vital Statistics of Michigan.

In these exhibits, the months in which more than the average per cent of weekly reports stated the presence of the disease under consideration are placed in one group, and in another group are placed the months in which less than the average per cent of weekly reports stated presence of the given disease; and by means of propositions which relate to the meteorological conditions existing when the disease is thus indicated to have been more or less than usually prevalent, both of these groups are compared with the average for the year. The result of each comparison may be learned by reading the proposition and noting the number of exceptions or the absence of exceptions thereto.

In cases in which the per cent of reports stating presence of the disease for one month is the same as that for another month or as the average, the order of arrangement of the months has been determined by fractional per cents rejected in printing.

INFLUENCE OF COLD DRY AIR ON THE AIR PASSAGES.

Cold air is always dry, however great may be its per cent of saturation. When cold dry air is inhaled, there are two prominent effects produced on the lungs and air passages: 1. The *cooling* of the exposed surfaces, by the the abstraction of heat to warm the inhaled air to the temperature at which it is exhaled, and by the abstraction of heat in the evaporation of so much moisture as is required to increase the humidity of the air inhaled to the humidity at which it is exhaled—or nearly to the point of saturation at 98° F.; 2. The *drying* of the exposed surfaces by the rapid absorption therefrom of moisture by the air inhaled, which air has had its capacity to contain moisture greatly increased by the elevation of its temperature. It seems evident that the effects from these causes will be the greater, the colder and drier the air inhaled.*

THE PREVENTION OF CLIMATIC DISEASES.

When speaking of the probable climatic causation of croup and pneumonia, the writer of this paper has several times been asked of what use the knowledge was likely to be, since the climatic characters of the State were beyond man's control. The reply is that when once such a cause is certainly and generally known, the disease is almost as certainly preventable; because of two series of facts: 1, in all civilized countries, during quite a large proportion of the time, human beings breathe air more or less modified by indoor conditions, and capable of being very much more modified in several of its important characters—such as temperature, humidity, etc., whenever man shall conclude that such modifications are important. 2, human beings are capable of withstanding for a short period of time conditions which if experienced for a long period of time, might prove fatal. Taking these facts into consideration, it seems evident that any disease due to long-continued exposure to cold air, to dry air, or even to moist air, may be in great part prevented as soon as the facts concerning such causation of disease are generally known. Among the great masses of the population, comparatively few occupations keep the person exposed to outdoor conditions during more than one-half of the twenty-four hours in each day, and this exposure is usually broken by one interval, or more, at meal-times, within a house. Man's present ability to control the temperature and the humidity of the air in dwellings and other buildings is very great; and it seems entirely probable that whenever it becomes generally known that diseases may be prevented, and how certain diseases may be prevented, by properly controlling the quality of the air-supply in workshops, public assembly rooms, dwellings, and especially in sleeping-rooms, the intelligent people of our State will not be slow to put such knowledge in use for the prevention of sickness and deaths in their midst.

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*It has been suggested by a gentleman in the office of the Board, that when the atmosphere is cold the chilling of the lungs and air passages occurs by the abstraction of heat not only in warming the inhaled air, and in the evaporation of moisture from the exposed surfaces, but also in raising the temperature of the *vapor of water in the inhaled air* to the temperature at which it is exhaled; and that with air at a given low temperature this last-mentioned effect will be the greater the greater the amount of moisture in the air inhaled, or the greater its per cent of saturation. And he suggests that the propositions concerning the relations of croup and pneumonia to the relative humidity, or per cent of saturation, of the atmosphere—stated in foot-notes "c" on pages 303 and 304—should be reversed, making the foot-notes read, "Exceptions to the proposition that *more* than the average per cent of weekly reports stated presence of pneumonia (or croup) in months when the Relative Humidity of the atmosphere was *greater* than the average for the year; and *less*, in months when it was less than the average." It is worthy of note than when the propositions are thus stated, there are, for the year 1877, but two exceptions with regard to pneumonia, and but one with regard to croup.

RELATIONS OF CROUP TO METEOROLOGICAL CONDITIONS.

In the Registration Reports of Michigan, the writer has shown that the deaths from Croup seem to have a constant relation to some of the qualities of the atmosphere, that in months when more than the average number of deaths are returned as having occurred from Croup the air is more than usually cold and dry, dry absolutely; that is to say, it does not contain the average quantity of vapor of water, though it may contain all it is capable of containing at a low temperature. The capacity of air for moisture increases rapidly with increase of temperature, so that when cold air saturated with moisture is inhaled, warmed, and expired, it takes with it much vapor of water derived from the moist surfaces of the air passages.

Exhibit 11, relating to *sickness* from Croup, pages 302–3, confirms the evidence of the similar tables, in the Vital Statistics of Michigan, relative to *deaths* from Croup. It will be seen that when more than the average per cent of the weekly reports of diseases stated the presence of Croup the air was colder and drier than the average, the ozone was excessive, and the range of the barometer was greater than the average; and that the opposite conditions existed in months when less than the average per cent of the weekly reports of diseases stated the presence of Croup. By examining the exhibit, it will be seen that the propositions relative to coldness, dryness, excess of night ozone, and range of pressure of the atmosphere, hold true in eleven cases out of twelve.

This being the first year for which this study has been possible in connection with the *sickness* from Croup, it will be interesting to continue the study, and learn how constant these relations are, and to what causes the exceptions are due.

EXHIBIT 11.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Membraneous Croup, during the Year and during each Month of the Year 1877, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.**

	MONTHS IN ORDER OF PER CENT OF WEEKLY REPORTS STATING PRESENCE OF MEMBRANEOUS CROUP.	Per Cent of Weekly Reports Stating Presence of Membraneous Croup.†	Av. Order of Prevalence where Prevalent. †, ‡	AV. TEMPERATURE. Degrees Fahr.			INCHES OF RAIN AND MELTED SNOW.	HUMIDITY OF ATMOSPHERE. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		VAPOR INHALED AND EXHALED.		OZONE,—RELATIVE. Scale of 10 Degrees of Coloration.		PRESSURE OF ATMOSPHERE. Inches of Mercury.		
				AV. RANGE.		Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.								RANGE OF BAROMETER.		Barometer Reduced to 32° Fahr.,—Average.
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.			Relative Humidity, or Per Cent of Saturation.	Grains of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day,—7 A. M. to 2 P. M.	Night,—9 P. M. to 7 A. M.	Monthly, and for Year. (Corrected for Temperature.)	Av. Daily Range of Observ'ns at 7 A. M., 2 P. M., and 9 P. M.,—Reduced to 32° F.	
	Year 1877...	6	6.1	**107°	**100°	47.42	37.40	81	3.63	2.27	9.41	3.66	3.33	1.539	.108	29.066
Greater than the Av. Per Cent.	Jan...	14	5	a12.26	a19.65	18.14	1.33	c 91	1.39	0.87	10.81	4.87	5.03	.896	.175	i 29.057
	Feb...	10	5	a14.86	a20.11	32.33	0.00	c 85	2.10	1.31	10.37	4.54	4.14	.977	.120	29.124
	Dec...	10	5	a 8.77	a12.77	36.57	1.03	c 89	2.58	1.51	10.07	e 3.17	3.37	.832	.117	29.178
	Mar...	9	6	15.19	24.06	24.18	5.58	c 91	1.73	1.08	10.60	e 5.29	6.06	1.119	.147	i 28.981
	Nov...	7	6	a11.47	a12 57	35.20	3.67	c 88	2.44	1.53	10.15	e 3.60	3.73	1.124	.149	29.100
	Average ...	6	6.1	15.06	21.93	47.42	3.12	81	3.63	2.27	9.41	3.66	3.33	.758	.108	29.066
Less than the Av. Per Cent. of Mem. Croup.	Apr...	5	7	a16.13	a25.43	b46.14	4.14	c 70	d 2.85	d 1.78	d 9.90	e 3.70	f4.27	g.789	h .110	28.971
	May...	5	7	a16.52	a27.77	58.28	2.23	c 67	4.16	2.60	9.08	3.29	2.94	.676	.082	29.056
	Oct...	4	7	13.81	16.27	50.73	5.69	83	3 80	2.38	9.30	3.20	3.19	.695	.105	i 29.077
	June...	3	10	a17.37	a25.27	66.29	8.53	c 75	5.52	3.45	8.23	3.17	2.90	.513	.084	29.021
	Sept...	3	7	a18.97	a22.93	61.28	1.38	c 80	5.03	3.14	8.54	2.93	1.53	.417	.071	i 29.121
	Aug...	2	10	a17.45	a27.00	68.48	6.57	c 77	5.94	3.71	7.97	3.42	1.03	.401	.058	29.046
	July...	2	18	a18.07	a29.06	71.39	2.25	c 70	5.96	3.73	7.95	2.71	1.77	.655	.085	29.062

* Additional statements relative to meteorological conditions may be found in an article on the Principal Meteorological Conditions in Michigan in 1877, on pages 211-250 of this Report. Statements relative to the soil moisture, by months in 1877, are given in Exhibits 5 and 6, and in summary foot-notes on pages 122-3.

† Explanations of statements in these columns, and other statements relative to the prevalence, in 1877, of the disease under consideration, may be found in Tables 2 and 3, pages 262-290, of this Report.

‡ Small numbers, in this column, indicate great prevalence in the localities where the disease occurred, as compared with other diseases; and large numbers, a less prevalence. But see pages 256-7.

§ Calculated from readings of dry-bulb and wet-bulb thermometers.

Calculated for 18 respirations per minute, of 20 cubic inches of air each.

¶ Assuming the air exhaled to be saturated with vapor at the temperature of 98° F., in which case each cubic foot of air contains 18.69 grains of vapor, and 18 respirations

Comments on the evidence presented in Exhibit 11, relative to relations of membraneous croup to certain meteorological conditions, are given on pages 294, 299-300, and 301. The exhibit should also be studied in connection with Diagram 1, page 292, and with diagrams on pages 221, 230, 241, 243, 248, which give graphic representations, by months, of leading meteorological conditions in Michigan in 1877.

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per minute, of 20 cubic inches of air each, make 11.68 Troy ounces of vapor exhaled daily. No correction has been made for expansion of the air after it is inhaled.

** Not an average, but the extreme range for the year.

a Exceptions to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the Average Daily Range of Temperature was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

b An exception to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the Average Daily Temperature was **lower** than the average for the year; and **less**, in months when it was **higher** than the average.

c Exceptions to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the Relative Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average.

d There is one exception to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the Absolute Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average. It follows that, with this one exception, the quantity of vapor inhaled daily was **less**, and that the amount exhaled daily in excess of that inhaled was **greater**, in months when **more** than the average per cent of reports stated presence of membraneous croup; and that **more** vapor was inhaled, and a **less** excess exhaled daily, in months when **less** membraneous croup was reported.

e Exceptions to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the amount of Ozone in the atmosphere, as indicated by the Day observation, was **greater** than the average of day observations for the year; and **less**, in months when it was **less** than the average.

f An exception to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the amount of Ozone in the atmosphere, as indicated by the Night observation, was **greater** than the average of night observations for the year; and **less**, in months when it was **less** than the average.

g An exception to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the Monthly Range of the Barometer was **greater** than the average monthly range for the year; and **less**, in months when it was **less** than the average.

h An exception to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the Average Daily Range of the Barometer was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

i Exceptions to the proposition that **more** than the average per cent of reports stated presence of membraneous croup in months when the Average Daily Pressure of the Atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

EXHIBIT 12.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Pneumonia, during the Year and during each Month of the Year 1877, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Mich., and near the center of the thickly-settled part of the State.**

	Months in Order of Per Cent of Weekly Reports Stating Presence of Pneumonia.			Av. Temperature. Degrees Fahr.			Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		Vapor Inhaled and Exhaled.		Ozone,—Relative. Scale of 10 Degrees of Coloration.		Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.)		
		Per Cent of Weekly Reports Stating Presence of Pneumonia.†	Av. Order of Prevalence where Prevalent.†, ‡	Range, Av. Daily, and for Year. Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	Range, Av. Daily, and for Year. During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.		Relative Humidity, or Per Cent of Saturation.	Grains of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day,—7 A. M. to 2 P. M.	Night,—9 P. M. to 7 A. M.	Range of Barometer. Monthly, and for Year.	Range of Barometer. Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
	Year 1877...	40	4	**107	**100	47.42	37.40	81	3.63	2.27	9.41	3.66	3.33	1.539	.108	29.066
Greater than the Av. Per Cent.	Jan...	70	3	*a*12.26	*a*19.65	18.14	1.33	*c* 91	1.39	0.87	10.81	4.87	5.03	.896	.175	*i* 29.057
	Feb...	67	3	*a*14.86	*a*20.11	32.33	0.00	*c* 85	2.10	1.31	10.37	4.54	4.14	.977	.120	29.124
	Mar...	63	3	15.19	24.06	24.18	5.58	*c* 91	1.73	1.08	10.60	5.29	6.06	1.119	.147	*i* 28.981
	Apr...	55	3	16.13	25.43	46.14	4.14	70	2.85	1.78	9.90	3.70	4.27	.789	.110	*i* 28.971
	Dec...	53	4	*a* 8.77	*a*12.77	36.57	1.03	*c* 89	2.58	1.61	10.07	*e* 3.17	3.37	.832	.117	29.178
	Nov...	40	5	*a*11.47	*a*12.57	35.20	3.67	*c* 88	2.44	1.53	10.15	*e* 3.60	3.73	1.124	.149	29.100
	Average....	40	4	15.06	21.93	*b* 47.42	3.12	81	*d* 3.63	*d* 2.27	*d* 9.41	3.66	*f* 3.33	*g* .758	*h* .108	29.066
Less than the Av. Per Ct. of Pneumonia.	May..	38	4	*a*16.52	*a*27.77	58.28	2.23	*c* 67	4.16	2.60	9.08	3.29	2.94	.676	.082	29.056
	June.	23	4	*a*17.37	*a*25.27	66.29	3.53	*c* 75	5.52	3.45	8.23	3.17	2.90	.513	.084	29.021
	Oct...	23	5	13.81	16.27	50.73	5.69	83	3.80	2.38	9.30	3.20	3.19	.695	.105	*i* 29.077
	July..	15	6	*a*18.07	*a*29.06	71.39	2.25	*c* 70	5.96	3.73	7.95	2.71	1.77	.655	.085	29.062
	Sept..	15	7	*a*18.97	*a*22.93	61.28	1.38	*c* 80	5.03	3.14	8.54	2.93	1.53	.417	.071	*i* 29.121
	Aug...	14	7	*a*17.45	*a*27.00	68.48	6.57	*c* 77	5.94	3.71	7.97	3.42	1.03	.401	.058	29.046

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[1] A common, though longer, name for Pneumonia is "Inflammation of the Lungs."

*, †, ‡, §, ‖, ¶. See foot-notes, with these marks, in Exhibit 11, page 302.

** Not an average, but the extreme range for the year.

a Exceptions to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the Average Daily Range of Temperature was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

b There is no exception to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the Average Daily Temperature was **lower** than the average for the year; and **less**, in months when it was **higher** than the average.

c Exceptions to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the Relative Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average.

RELATIONS OF PNEUMONIA[j] TO METEOROLOGICAL CONDITIONS.

Exhibit 12 carries forward one step work already done by the writer in compiling the returns of deaths in the State, in connection with meteorological conditions, for the Fourth, Fifth, and Sixth Registration Reports of the State Department, Vital Statistics of Michigan for the years 1870–1–2. So far as statements for a single year can do, this Exhibit, relating to sickness from pneumonia, confirms the evidence there presented relative to deaths from this disease.

It will be seen that pneumonia seems to prevail most when the air is cold and dry (absolutely, not relatively to the point of saturation, which is a fluctuating quantity); when the atmospheric ozone is excessive; when the range of the barometer is greater than the average: that it seems to prevail least when the opposite conditions exist.

In this connection, reference may be made to remarks concerning the influence of cold dry air on the air-passages, on pages 294 and 299–300; to Diagram 1, page 292, wherein the course of the disease is graphically represented by months; and to diagrams on pages 221, 230, 241, 243, and 248, in which are given graphic representations, by months in the year 1877, of certain meteorological conditions believed to bear important relations to the disease in question.

Statements relative to the soil moisture, by months in 1877, may be seen in Exhibits 5 and 6, and in summary foot-notes, on pages 122–3.

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[d] There is no exception to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the Absolute Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average. It follows that the quantity of vapor inhaled daily was **less**, and that the amount exhaled daily in excess of that inhaled was **greater**, in months when **more** than the average per cent of reports stated presence of pneumonia; and that **more** vapor was inhaled, and a **less** excess exhaled daily, in months when **less** pneumonia was reported.

[e] Exceptions to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the amount of Ozone in the atmosphere, as indicated by the Day observation, was **greater** than the average of day observations for the year; and **less**, in months when it was **less** than the average.

[f] There is no exception to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the amount of Ozone in the atmosphere, as indicated by the Night observation, was **greater** than the average of night observations for the year; and **less**, in months when it was **less** than the average.

[g] There is no exception to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the Monthly Range of the Barometer was **greater** than the average monthly range for the year; and **less**, in months when it was **less** than the average.

[h] There is no exception to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the Average Daily Range of the Barometer was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

[i] Exceptions to the proposition that **more** than the average per cent of reports stated presence of pneumonia in months when the Average Daily Pressure of the Atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

[j] A common, though longer, name for Pneumonia is "Inflammation of the Lungs."

EXHIBIT 13.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Rheumatism, during the Year and during each Month of the Year 1877, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the Center of the thickly-settled part of the State.**

MONTHS IN ORDER OF PER CENT OF WEEKLY REPORTS STATING PRESENCE OF RHEUMATISM.†		Per Cent of Weekly Reports Stating Presence of Rheumatism.†	Av. Order of Prevalence where Prevalent.†, ‡	AV. TEMPERATURE. Degrees Fahr.			INCHES OF RAIN AND MELTED SNOW.	HUMIDITY OF ATMOSPHERE. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		VAPOR INHALED AND EXHALED.		OZONE,—RELATIVE. Scale of 10 Degrees of Coloration.		PRESSURE OF ATMOSPHERE. Inches of Mercury. (Reduced to 32°F.)		
				AV. RANGE.										RANGE OF BAROMETER.		
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.		Relative Humidity, or Per Cent of Saturation.	Grains of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day,—7 A. M., to 2 P. M.	Night,—9 P. M., to 7 A. M.	Monthly, and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1877...		60	4	**107°	**100°	47.42	37.40	81	3.63	2.27	9.41	3.66	3.33	1.539	.108	29.066
Greater than the Av. Per Cent of Rheumatism.	Nov...	79	4	*a*11.47	*a*12.57	35.20	3.67	*c* 88	2.44	1.53	10.15	*e* 3.60	3.73	1.124	.149	29.100
	Dec...	75	4	*a* 8.77	*a*12.77	36.57	1.03	*c* 89	2.58	1.61	10.07	*e* 3.17	3.37	.832	.117	29.178
	Jan...	68	4	*a*12.26	*a*19.65	18.14	1.33	*c* 91	1.39	0.87	10.81	4.87	5.03	.896	.175	*i* 29.057
	Feb...	68	4	*a*14.86	*a*20.11	32.33	0.00	*c* 85	2.10	1.31	10.37	4.54	4.14	.977	.120	29.124
	Oct...	65	4	*a*13.81	*a*16.27	*b*50.73	5.69	*c* 83	*d* 3.80	*d* 2.38	*d* 9.30	*e* 3.20	*f* 3.19	*g* .695	*h* .105	29.077
	Mar...	64	4	15.19	24.06	24.18	5.58	*c* 91	1.73	1.08	10.60	5.29	6.06	1.119	.147	*i* 28.981
	Apr...	61	4	16.13	25.43	46.14	4.14	70	2.85	1.78	9.90	3.70	4.27	.789	.110	*i* 28.971
	May...	60	4	16.52	27.77	*b*58.28	2.23	67	*d* 4.16	*d* 2.60	*d* 9.08	*e* 3.29	*f* 2.94	*g* .676	*h* .082	*i* 29.056
Average.		60	4	15.06	21.93	47.42	3.12	81	3.63	2.27	9.41	3.66	3.33	.758	.108	29.066
Less than the Av. Per Ct.	Sept...	48	5	*a*18.97	*a*22.93	61.28	1.38	*c* 80	5.03	3.14	8.54	2.93	1.53	.417	.071	*i* 29.121
	June...	48	4	*a*17.37	*a*25.27	66.29	3.53	*c* 75	5.52	3.45	8.23	3.17	2.90	.513	.084	29.021
	July...	42	4	*a*18.07	*a*29.06	71.30	2.25	*c* 70	5.96	3.73	7.95	2.71	1.77	.655	.085	29.062
	Aug...	33	5	*a*17.45	*a*27.00	68.48	6.57	*c* 77	5.94	3.71	7.97	3.42	1.03	.401	.058	29.046

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*, †, ‡, §, ‖, ¶ See foot-notes, with these marks, in Exhibit 11, page 302.

** Not an average, but the extreme range for the year.

a Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Average Daily Range of Temperature was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

b Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Average Daily Temperature was **lower** than the average for the year; and **less**, in months when it was **higher** than the average.

c Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Relative Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average.

Remarks on the subject of Rheumatism are printed on page 299, and the course of the disease by months is graphically exhibited in Diagram 3, page 298, which may profitably be studied in connection with diagrams on pages 221, 230, 233, 237, 241, 243, and 248, exhibiting statements of meteorological conditions in Michigan, by months during the same year—1877.

Rheumatism has been believed to be due to the retention in the body of certain waste products which should be excreted from the body, mostly by way of the kidneys. When we learn that in each twenty-four hours, in certain months, ten ounces of vapor of water is taken out by way of the lungs (see in the tenth column of figures opposite the months of Nov., Dec., Jan., Feb., and March), leaving in the body most of those particular waste products to which rheumatism is attributed, and which should be washed out by way of the kidneys, it does not seem very strange that, as appears by foot-note "*d*" to Exhibit 13, there are only two exceptions to the proposition that "MORE than the average per cent of reports stated presence of rheumatism in months when the humidity of the atmosphere was LESS than the average for the year, and LESS than the average per cent of reports stated presence of rheumatism in months when the humidity was GREATER than the average." It must not, however, be assumed that the close and almost quantitative relation which this disease appears to bear to coldness and humidity of the atmosphere in 1877, will be found to be a constant relation.

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d There are two exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Absolute Humidity of the atmosphere was **less** than the average for the year; and **less**, in months when it was **greater** than the average. It follows that, with these two exceptions, the quantity of vapor inhaled daily was **less**, and that the amount exhaled daily in excess of that inhaled was **greater**, in months when **more** than the average per cent of reports stated presence of rheumatism; and that **more** vapor was inhaled, and a **less** excess exhaled daily, in months when **less** rheumatism was reported.

e Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the amount of Ozone in the atmosphere, as indicated by the Day observations, was **greater** than the average of day observations for the year; and **less**, in months when it was **less** than the average.

f Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the amount of Ozone in the atmosphere, as indicated by the Night observations, was **greater** than the average of night observations for the year; and **less**, in months when it was **less** than the average.

g Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Monthly Range of the Barometer was **greater** than the average monthly range for the year; and **less**, in months when it was **less** than the average.

h Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Average Daily Range of the Barometer was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

i Exceptions to the proposition that **more** than the average per cent of reports stated presence of rheumatism in months when the Average Daily Pressure of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

EXHIBIT 14. *Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Intermittent Fever during the Year and during each Month of the Year 1877, Compared with some given Meteorological Conditions existing at the same time, at the State Agricultural College, near Lansing, Michigan, and near the center of the thickly-settled part of the State.**

Months in Order of Per Cent of Weekly Reports Stating Presence of Intermittent Fever.		Pr.ct.of Rep'ts Stating Presence of Intermit. Fever †	Av. Order of Prevalence where Prevalent. †, ‡.	Av. Temperature. Degrees Fahr.			Inches of Rain and Melted Snow.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		Vapor Inhaled and Exhaled.		Ozone,—Relative. Scale of 10 Degrees of Coloration.		Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.)			
				Range,—for Year, and Av. Daily.										Range of Barometer.			
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A.M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.		Relative Humidity, or Per Cent of Saturation.	Grains of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled. ¶	Day,—7 A. M., to 2 P. M.	Night,—9 P. M., to 7 A. M.	Monthly, and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.	Per Cent of Observations at which the Barometer was Lower than at the Preceding Observation.
Year 1877		75	2.2	**107°	**100°	47.42	37.40	81	3.63	2.27	9.41	3.66	3.33	1.539	.108	29.066	51
More than the Average Per Cent of Int. Fever.	Aug.	90	2	17.45	27.00	68.48	6.57	*c* 77	5.94	3.71	7.97	3.42	1.03	*g* .401	*h* .058	*i*29.046	52
	July.	90	2	18.07	29.06	71.39	2.25	*c* 70	5.96	3.73	7.95	2.71	1.77	*g* .655	*h* .085	*i*29.062	*j* 49
	June	90	1	17.37	25.27	66.29	3.53	*c* 75	5.52	3.45	8.23	3.17	2.90	*g* .513	*h* .084	*i*29.021	51
	Sept.	89	2	18.97	22.93	61.28	1.38	*c* 80	5.03	3.14	8.54	2.93	1.53	*g* .417	*h* .071	29.121	53
	Oct.	87	2	*a*13.81	*a*16.27	50.73	5.69	83	3.80	2.38	9.30	3.20	3.19	*g*. 695	*h* .105	29.077	*j* 51
	May.	85	2	16.52	27.77	58.28	2.23	*c* 67	4.16	2.60	9.08	3.29	2.94	*g* .676	*h* .082	*i*29.056	*j* 45
	Nov.	81	2	*a*11.47	*a*12.57	*b*35.20	3.67	88	*d* 2.44	*d*1.53	*d*10.15	3.60	*f* 3.73	1.124	.149	29.100	58
Average		75	2.2	15.06	21.93	47.42	3.12	81	3.63	2.27	9.41	3.66	3.33	.758	.108	29.066	51
Less than the Average Per Cent.	Dec.	73	2	8.77	12.77	36.57	1.03	*c* 89	2.58	1.61	10.07	*e*3.17	3.37	*g* .832	*h* .117	*i*29.178	49
	April	70	2	*a*16.13	*a*25.43	46.14	4.14	70	2.85	1.78	9.90	3.70	4.27	*g* .789	*h* .110	28.971	47
	Mar.	57	3	*a*15.19	*a*24.06	24.18	5.58	*c* 91	1.73	1.08	10.60	5.29	6.06	*g*1.119	*h* .147	28.981	*j* 52
	Feb.	52	3	14.86	20.11	32.33	0.00	*c* 85	2.10	1.31	10.37	4.54	4.14	*g* .977	*h* .120	*i*29.124	48
	Jan.	47	4.	12.26	19.65	18.14	1.33	*c* 91	1.39	0.87	10.81	4.87	5.03	*g* .896	*h* .175	29.057	*j* 55

*, †, ‡, §, ‖, ¶. See foot-notes, with these marks, in Exhibit 11, page 302.

** Not an average, but the extreme range for the year.

a Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Average Daily Range of Temperature was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

b An exception to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Average Daily Temperature was **higher** than the average for the year; and **less**, in months when it was **lower** than the average.

c Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Relative Humidity of the

Concerning the relation of intermittent fever to other diseases, remarks are made on page 294. In Diagram 3, page 298, is given a graphic representation of the prevalence of the disease by months in 1877, as denoted by the per cent of weekly reports stating its prevalence. Certain leading meteorological conditions in 1877 are graphically represented in diagrams on pages 221–248. In Exhibits 5 and 6, pages 122–123, and in summary foot-notes on the same pages, are given statements relative to the ground water, and soil moisture by months in 1877.

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atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

[d] There is one exception to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Absolute Humidity of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average. It follows that, with this one exception, the quantity of vapor inhaled daily was **greater**, and that the amount exhaled daily in excess of that inhaled was **less**, in months when **more** than the average per cent of reports stated presence of intermittent fever; and that **less** vapor was inhaled, and a **greater** excess exhaled daily, in months when **less** intermittent fever was reported.

[e] An exception to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the amount of Ozone in the atmosphere, as indicated by the Day observation, was **less** than the average of day observations for the year; and **less**, in months when it was **greater** than the average.

[f] An exception to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the amount of Ozone in the atmosphere, as indicated by the Night observation, was **less** than the average of night observations for the year; and **less**, in months when it was **greater** than the average.

[g] Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Monthly Range of the Barometer was **greater** than the average monthly range for the year; and **less**, in months when it was less than the average.

[h] Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Average Daily Range of the Barometer was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

[i] Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when the Average Daily Pressure of the atmosphere was **greater** than the average for the year; and **less**, in months when it was **less** than the average.

[j] Exceptions to the proposition that **more** than the average per cent of reports stated presence of intermittent fever in months when **more** than the average per cent of observations indicated a falling Barometer; and **less**, in months when **less** than the average per cent of observations indicated a falling Barometer.

CORONERS AND CORONERS' INQUESTS:

A REPORT

MADE TO THE MICHIGAN

STATE BOARD OF HEALTH,

BY

Hon. LEROY PARKER, OF FLINT, MICH.,

MEMBER OF THE

STATE BOARD OF HEALTH,

AND ITS COMMITTEE ON LEGISLATION IN THE INTERESTS OF PUBLIC HEALTH.

CORONERS AND CORONERS' INQUESTS.

The frequent occurrence, in all communities, of deaths which are not the natural result of disease or decay of the system, or which are produced by hidden and obscure causes, has led to the establishment, by law, of methods of investigation by which the causes which produced such deaths are sought to be discovered. The importance of such investigations has been recognized by most, if not all, civil governments from the very earliest times; and provision has been made for the selection of suitable persons whose duty it was, when any person was found dead, and violence or crime was suspected as the cause of death, to diligently inquire how and in what manner the person came to his death.

This duty, under the laws and customs in force in England, devolved upon the coroner, who was an officer representing the crown, from whence he derived his title. The office is a very ancient one, and was formerly one of great honor and dignity. By a statute of Edward I., it could only be held by lawful and discreet knights. Coke calls the Chief Justice of the King's Bench the chief coroner of the kingdom; and he might, if he chose, exercise the jurisdiction of a coroner in any part of the realm.

Chaucer pays this tribute to the dignity of the coroner's office, in describing the Frankelin:

> At sessions ther was he lord and Sire,
> Ful often time he was Knight of the Shire;
> A shereve hadde he ben, and a coronour:
> Was no wher swiche a worthy vavasour.

The functions of the coroner at that time were varied and important. He was a conservator of the peace, and in the absence or incapacity of the sheriff he performed the duties of that office. This part of the coroners' duty has survived to this day; and by our statute the coroner is authorized to perform the official duties of the sheriff in case there is no sheriff or under sheriff, or in case the sheriff is a party to, or interested in, any suit or proceeding. He acted for the crown in inquiring of wrecks, and in taking charge of royal fishes cast up by the sea. He inquired who were the finders of treasure trove, and whether it had been concealed. He was appointed to assay all weights and measures, according to established standards. In connection with the duty of inquiring concerning deaths, he was to inquire whether any deodand had accrued to the king or the lord of the franchise, and to see that the same was duly forfeited.

NOTE.—For much valuable information upon this topic, I am indebted to Theodore P. Tyndale, a member of the Boston Bar, whose pamphlets entitled "Notes on Coroners," and "The Law of Coroners," have proven valuable contributions to the literature of the subject.

The first duty of the coroner, however, and the one which that officer now principally exercises, was, when any person was slain or died suddenly or in prison, to inquire concerning the manner of his death. In the words of the statute, 4 Edw. I., *de officio coronatoris,* "as soon as any felony or misadventure do happen, or treasure be found unlawfully hid in the earth: or of the rape of women, or of the breaking of prison, or man dangerously wounded, or of other accident happening, the coroner immediately, upon notice," was to issue a summons to a jury. Upon the appearance of the jury they were sworn and charged by the coroner to inquire, upon the view of the body, how the party came to his death. If any were found guilty, by this inquest, of murder or other homicide, it was the duty of the coroner to commit them to prison for further trial, and to certify the whole of the inquisition, under his own seal or the seals of his jurors, together with the evidence thereon, to the Court of King's Bench or the next assizes.

The various duties of the coroner, above enumerated, have with two exceptions become gradually obsolete or have been transferred to other officers. These exceptions are, inquiring into the causes of sudden deaths; and acting as substitute for the sheriff under certain circumstances. In these respects there has been but little change in the law of coroners for several centuries.

The jury which was summoned by the coroner, was, until about the fifteenth century, composed solely of those persons who had or were supposed to have knowledge of the circumstances attending the occurrence to be inquired into. They were summoned as witnesses to show what they knew of the causes of any death happening. They did not act as judges, so much as accusers. In later years their office was somewhat similar to that of the modern grand jury. They investigated the circumstances of any killing or violent death, and if the evidence pointed to any person as being probably guilty of the crime, their finding was the indictment upon which the trial of the suspected person was had.

It will be seen from this brief reference to the early history of coroners, that their duty, in connection with the finding of any dead body, was to elicit such facts in relation thereto as would aid in the detection of the criminal, should it appear that the killing was criminal in its nature. In case the death were sudden, and happened as a result of some hidden and previously unknown cause, this might also be inquired into, even though there was no suspicion of crime; the cause of death might be investigated, and the facts thus developed used as a basis for such preventive and restrictive measures as the wisdom of the age could suggest.

The laws in force in this country, which are substantially the same as the English laws, have remained practically unchanged for centuries. But while the letter of the law remains, it is a serious question whether the spirit of that law has not in a large measure fled. The failure of the system fully to effect its object in arriving at correct conclusions as to the causes of sudden deaths, or deaths by violence, has led to considerable discussion in some States of the Union, as to the advisability of so remodelling and re-adjusting the laws upon this subject as to secure more certain and useful results. In one State at least, that of Massachusetts, the existing defects in the system as there administered, and the lack of efficiency in the working of the law has led to a radical change in the statute regulating inquests, and to the entire abolishing of the ancient and once honored office of coroner.

That there is good ground for this feeling of dissatisfaction with the administration of the law pertaining to coroners and coroners' inquests, is abundantly proven by the numerous instances, which must have fallen under the observation of each one of you, where the investigation, by the coroner and his jury, of cases of violent death has bordered closely upon the farcical, and the result arrived at in their verdict has been simply absurd. In fact, in modern times the verdict of a coroner's jury has come to be considered as almost synonomous with things uncertain, mysterious, and past finding out. In those cases of wholesale slaughter which so frequently occur in our country, from defective boilers, negligent railway employes, or over-crowded buildings with weak foundations and insufficient means of exit, the coroner and his jury have grand opportunities for administering merited rebuke to the parties who are responsible, by reason of their carelessness and negligence, for the disasters which so often result from such criminal negligence; and they might, by bringing the guilty persons to the bar of public justice, by their verdict, do much towards diminishing the frequency of these slaughters, falsely called accidents.

But too often it happens, after the country has been startled by the report of some terrible disaster by rail or by steam or in crowded halls, where perhaps hundreds of lives are lost, that the jury summoned to inquire into the causes of the disaster returns only the stereotyped verdict, "No one to blame."

Much of the low esteem in which the office of coroner is generally held, is due, also, to the fact that they too often, for the purpose of gaining their fees, rush with unseemly haste to secure the opportunity of holding an inquest upon the body of some person reported to be dead, when by no process of reasoning could an inquest be considered necessary. My attention has been called more than once, through newspaper notices, to instances in our own State, where rival coroners (strange that there should be rivalry in such a calling) have vied with each other in their efforts to obtain jurisdiction over a dead body; and have utterly failed to exercise that discretion which the statutes of the State plainly require them to exercise, in holding an inquest only when in their judgment it shall be necessary.

The coroner and his jury have been a butt of ridicule from the time when Shakespeare's grave-digger made light of "crowner's quest law," and ironically accepted the verdict upon Ophelia's death as entitling her to Christian burial. Blackstone says, Vol. 4, page 348, "Now, indeed, through the culpable neglect of gentlemen of property, this office has been suffered to fall into disrepute, and get into low and indigent hands; so that, although formerly no coroners would condescend to be paid for serving their country, * * * yet for many years past they have only desired to be chosen for the sake of their perquisites."

On this account, perhaps, the office is one rarely sought for, except in large cities where the large emoluments compensate for any lack of dignity in the office; and few persons of the requisite ability and good judgment can be induced to accept it with the understanding that they will qualify and perform the duties which devolve upon them. I am aware that the good sense of the people in some localities in this State, has led them to select physicians of acknowledged ability, as coroners; but it has too often happened that the men selected for this position, possessed in very small degree that peculiar knowledge of the duties of their office, which a judicious and efficient execution of the law demands.

The theory of the law relating to coroners is that by means of an inquest upon a dead body facts may be brought to light which may lead to the detection of crime, should crime be suspected. If all the surroundings and circumstances of a sudden or violent death clearly show that no crime has been committed, as when a person has been killed by lightning or has been accidentally drowned, then any intervention of a coroner is needless and out of place, as much so as if the person had died in bed from the effects of fever or old age. But when there are suspicious circumstances attending a death, it is of the utmost importance that a careful and intelligent inquiry into all the facts should be made by thoroughly competent persons, and the real cause of the death ascertained. This should be done for two reasons: First, in order that any person who may have contributed to the death may be discovered and dealt with according to law; and, Second, when the cause of death is entirely unknown, and the symptoms preceding death and the appearance of the body afterwards do not indicate that such death was the result of any known disease or agent, that the unknown cause may if possible be discovered; and if it should prove to be some new disease, that its nature may be understood, and the proper measures be taken for its prevention and cure.

It is this latter ground of inquiry which directly concerns Boards of Health; for it is their duty to ascertain, in such way as they can, the causes of disease and to suggest such preventive measures as they deem advisable.

First in importance, however, is the inquiry, in the case of a person found dead, whether a homicide has been committed. In order to do this satisfactorily, the preliminary investigation should be conducted by a person who, from his education and experience, is familiar with all forms of wounds and bruises, and with the condition and appearance of bodies slain by violence or poisoning. As the coroner is to exercise his discretion in having an inquest follow a view of the body, it is of great importance that he should be able to determine from a preliminary inquiry or view, if an inquest is necessary, whether the marks on and about the body indicate violence inflicted by another, in which case an inquest should always be held; or whether the indications show death from known natural causes, in which case no further inquiry is needed.

It is sometimes difficult for one inexperienced to determine whether or not a person has come to his death by violence. Death is sometimes inflicted in such a manner as to deceive all save an accomplished surgeon, as to the manner in which it was inflicted. Yet upon the correct investigation of the causes of the death of a human being, may depend the detection and punishment of some secret murderer; or, on the other hand, by reason of a carelessly and ignorantly conducted inquest, some innocent person may be unjustly accused and suffer all the horrors of a baseless accusation, and may even be compelled to undergo a painful trial and possible condemnation.

How important is it, then, that the person chosen to perform this duty should be qualified in every respect for his responsible office! As the preliminary examination is for the purpose of ascertaining how and by what means the person came to his death, and as this can only be determined, in a great majority of cases, by intelligent anatomical and physical investigation, this part of the proceedings pertains solely to medical science and should be conducted by a medical expert. When it is determined how and by what means the person came to his death, the investigation ceases to be medical in its nature and becomes legal. The question then is—who did it? This question can be answered only by a judicial inquiry, in which witnesses are to be examined as to facts and surrounding circumstances. This inquiry, it is perhaps needless to say, should be conducted by a magistrate armed with power to compel the attendance of witnesses, and with authority to commit for trial any one suspected of the killing. Under our present system of conducting inquests, these two distinct and totally dissimilar functions, the medical and the legal, are conducted by one and the same person. Is it possible, in the great majority of cases, that persons thus doubly qualified can be secured to perform the duties of the office? I think it will be conceded that the instances are rare of a person being competent by experience and education to conduct both a medical and a legal examination. To be sure, both the justices of the peace and the coroners, who, under our statutes, conduct inquests, are authorized to subpœna competent physicians or surgeons for the purpose of making a *post-mortem* examination, *whenever it shall appear necessary.* But the very point to be decided, whether a *post-mortem* examination *is* necessary, is oftentimes outside the range of the coroner's or the justice's ability to decide correctly. A competent physician or surgeon may, in the first instance, upon view of a body, be able to decide whether an inquest is necessary, that is, whether the killing has been done by the direct act of any person or by carelessness or negligence, and whether a crime has been committed, and thus save the expense and trouble necessarily incurred in holding an inquest to determine this very fact.

Again, some ignorant quack with the assumed title of Doctor, may be called upon by an equally ignorant justice of the peace or coroner to make the *post-mortem* examination; and the testimony he gives may result either in suffering guilt to go concealed and unpunished, or in creating a groundless suspicion against the innocent and unoffending. It would seem advisable, then, in order to correct this evil in our present system, that the persons charged with the preliminary examination of the bodies of such persons as shall have come to their death suddenly or by violence, should be able and discreet, and learned in the science of medicine. It should be the duty of such person simply to decide whether the death was caused by violence or resulted from natural causes. If he should decide that the death was natural, that is, caused by natural agencies, then all proceedings in the case should end. If, on the other hand, he should decide that the death was caused by violence, either as the direct act of some person, or as a result of railroad accident, a boiler explosion, the falling of a floor, or any like cause, then he should at once lay the case before a magistrate, who should conduct the examination with a view to ascertain whether any one is guilty of the killing, and if any one, who is probably the guilty one. At the examination before the magistrate the evidence of the physician who viewed the body will, of course, be given, and such other witnesses examined as shall be able to throw light upon the question as to who caused the death and whether the killing was with a guilty intent.

In all cases under our statutes where a person is charged with a crime not cognizable by a justice of the peace, a preliminary examination is had before a magistrate, which is conducted in behalf of the people by the prosecuting attorney of the county; and if the evidence shows that there is probable cause to believe the prisoner guilty, the magistrate binds him over for trial at the Circuit Court for the County. This is a separate and distinct examination from the one held by the coroner, although the same witnesses are examined and the same facts ascertained. What good reason can be assigned for this double work and double expense to the county? When the examining physician lays the facts relating to a case of sudden or violent death before a magistrate, showing that crime has probably been committed, he at the same time can make complaint in the usual form against the suspected perpetrator. The magistrate can then issue his warrant for the arrest of the person complained of, and proceed with the examination as in other cases when crime is charged. The prosecuting attorney for the county can conduct the examination on behalf of the people, and all the evidence obtainable can then be presented. If there is probable cause to believe the accused guilty, the magistrate can bind him over for trial at the Circuit Court, or commit him to prison to await trial.

This procedure, if it might be adopted by our Legislature, would greatly simplify the holding of inquests, and would, I believe, decrease materially the expense of the double examination, which is now necessarily held under the present form of our statute. It will be observed that, in the plan suggested, no mention is made of the jury, which has always been considered a necessary adjunct of the coroner's inquest. I think experience has shown that the coroner's jury is a wholly useless and somewhat expensive addition to the system. Their sole duty is to make a finding of facts, which can be far more satisfactorily done by a medical expert than by those who usually compose the coroner's jury. I am informed, by coroners of large experience, that in the majority of cases the finding is made by the coroner himself, and the jury simply perform the duty of signing the verdict which has been prepared for them. So far as concerns the legal investigation, the magistrate before whom the examination is held would be as competent to decide as to the probable guilt of a person suspected of crime, as any six men picked up at random. No jury is now required to aid a magistrate in a preliminary examination where crime is charged, and certainly none need be necessary in an examination which partakes of the nature of an inquest.

The coroner's jury is a relic of a past age, when they were summoned as witnesses rather than as judges; and the retention of their services under our laws is only in accordance with a too frequent custom of our law-makers, of following a precedent because it is ancient, and retaining a provision of law upon our statute books long after the reason for it has ceased to exist.

The recent change in the law relating to coroners and coroners' inquests, which has been made in the State of Massachusetts, seems to me to be so excellent and so well adapted to securing the best results in investigating the causes of sudden deaths, that something more than a brief reference to its provisions in this paper will, I trust, be pardoned.

By the first section of the Massachusetts law, the office of coroner is abolished. The second section provides for the nomination, by the Governor, of able and discreet men, learned in the science of medicine, to be medical examiners. The law further provides that these examiners shall hold their office for the term of seven years; that they shall be appointed for certain districts in each county, to be designated by the county commissioners; and that they shall make examinations upon the view of the dead bodies of such persons only as are supposed to have come to their death by violence.

Whenever the medical examiner has notice that there has been found within his county the dead body of any person who is supposed to have come to his death by violence, he shall forthwith take charge of the same; and if on view thereof and personal inquiry into the cause and manner of the death, he deems a further examination necessary, he shall, upon being thereto authorized in writing by the district attorney, mayor or select men of the district, city, or town, where such body lies, in the presence of two or more discreet persons, whose presence he may compel by subpœna if necessary, make a *post-mortem* examination, and reduce to writing every fact and circumstance tending to show the condition of the body and the cause and manner of death, together with the names and addresses of said witnesses.

If upon such view or examination he shall be of the opinion that the death was caused by violence, he shall at once notify the district attorney and a magistrate, and shall file a copy of the record of his examination with the district attorney and the magistrate; and shall also certify to the registrar of births, deaths, and marriages for the county, the name, residence, description, and cause of death of the deceased.

The magistrate shall thereupon hold an inquest, which may be private; and the district attorney may attend the inquest and examine the witnesses. An inquest shall be held in all cases of death by accident upon any railroad, and the district attorney or Attorney General, may direct an inquest to be held in the case of any other casualty, from which the death of any person results, if in his opinion such inquest is necessary or expedient. The justice or district attorney may issue subpœnas to compel the attendance of witnesses before such justice.

After hearing the testimony the justice shall draw up a report in which he shall find and certify when, where, and by what means the person deceased came to his death, his name if known, and all material circumstances attending his death. If it appear that the death resulted from the unlawful act of any other person, he shall state in his report the name of such person, and shall file his report with the records of the superior court of the county wherein the inquest is held.

If the justice finds that murder, manslaughter, or an assault has been committed, he may bind over such witnesses as he deems necessary, to appear and testify at the court in which an indictment for such offense may be found or presented.

If the person charged by the report with the commission of the offense is not in custody, the justice shall issue process for his apprehension, returnable before any court or magistrate having jurisdiction, who shall proceed therein in the manner required by law.

If the medical examiner reports that the death was not caused by violence, and the district attorney or the attorney general shall be of a contrary opinion, either of them may direct an inquest to be held in accordance with the provisions of the law.

The medical examiner may call a chemist to aid in the examination of the body, or of substances supposed to have caused, or to have contributed to the death. Other provisions of the law are for the burial of dead bodies, the payment of proper fees, the taking charge of the property of the deceased found on his body, by the medical examiner, and the delivery of the same to the proper parties, and for the performance of the duties of sheriff when that officer is disqualified to act, by the sheriff or deputy sheriff of any adjoining county; or in case of a vacancy in the office, by the senior deputy sheriff of the county.

This system of medical examinations and judicial inquests upon dead bodies has been in operation in Massachusetts since July 1, 1877. From a recent article printed in the Boston Daily Post reviewing the progress and operation of the new law of inquests for the first year, I quote the following as showing the estimation in which this law is held:

"The new system went into operation July 1, 1877. It has, therefore, just completed its first year of trial, and an opportunity is now presented for reviewing its workings and comparing its merits with those of the old method. It is almost needless to say that the result has been such as to prove beyond a doubt the great superiority of the new system. Indeed, the evils of the old method were so apparent and so numerous, and the new mode of procedure so admirably calculated to remedy them, that it could hardly be called an experiment."

The writer of the above article estimates the annual saving of expense, in the holding of inquests, in Suffolk county alone, in which the city of Boston is situated, at fully 33⅓ per cent, by reason of the adoption of the new law. In the recently published Transactions of the Massachusetts Medico-legal Society, I also find evidence that the new system is favorably received, and in its practical results is considered to be far in advance of the old method.

A few changes in our statutes relating to coroners and coroners' inquests, in the direction which has been productive of such good results in our sister State of Massachusetts, would, it seems to me, prove of great advantage in simplifying the procedure and reducing the expenses of inquests as now conducted; and would be an invaluable aid to the more perfect administration of criminal justice, by securing more exact facts in relation to the causes of death where crime is suspected.

The great interests of public health would also be advanced by such a change in our laws as would require the persons charged with the duty of holding inquests to certify to the clerk of each county (or, which would be better, to the health officer in each township, city, and village), the name, age, residence, time and cause of death of each person upon whose body an inquest is held,—such report to be transmitted to the Superintendent of Vital Statistics; thus making available the records of death from obscure causes, which now are difficult to be obtained.

The principal changes suggested in the present law, which, if adopted by the Legislature, would produce more perfect and desirable results in the holding of inquests upon dead bodies, are as follows:

(1.) The abolition of the office of coroner, and of coroners' juries.

(2.) The appointment or election of medical experts to make the physical examination in cases of persons found dead or suddenly dying.

(3.) The holding of judicial investigations in cases where crime is suspected, by a magistrate other than the person who makes the physical examination.

The minor details necessary to insure the perfect working of this system will readily suggest themselves to those whose province it is to make and amend the laws of the State.

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ERRATA.

Page 10, third line of fifth paragraph, for *ecomical* read *economical.*

Page 20, ninth paragraph, third line, for *D. B. Lincoln* read *D. F. Lincoln.*

Page 28, third paragraph, fourth line, for *earthern* read *earthen.*

Page 36, foot-note, last line, transpose the quotation marks after the word *nerves* to stand after the signature *H. B. B.*

Page 66, first column of table, for *Pinkney* read *Pinckney.*

Pages 120 and 144, running head, for *1877* read *1878.*

Page 147, running head, for *1887* read *1877.*

Page 150, paragraph 11 of Replies of Dr. Stratton, his reply, "See answer 9" would seem to be an error for "See answer 7;" but the error was not noticed till after the page was printed. In accordance with this correction, the first paragraph on page 117, in the third column of Exhibit 3, should read "Absence of humidity, and long-continued low temperature, in Winter of 1876-7."

Page 153, first line, for *rhumatism* read *rheumatism.*

Page 174, eighth line from the bottom, for *Summerset* read *Somerset.*

Page 288, side-note *n*, fourth line, for *metrilis* read *metritis.*

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